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September 1982 \$2.00

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Surveyed**

**The Soul Of
A New Program**

**Servicing
Your Computer**

**Computer
Literacy:
Who
Needs It?**



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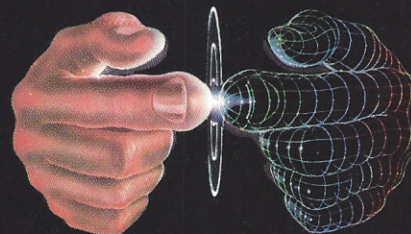
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CIRCLE 2

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PERSONAL COMPUTING

Paul Kellam
EDITOR

Robert Cubbedge
MANAGING EDITOR

David Gabel
SENIOR EDITOR

Jeffrey Rothfeder
Lee The'
ASSOCIATE EDITORS

Elli Holman
ASSISTANT EDITOR

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Robert J. Lydon
PUBLISHER

COVER PHOTOGRAPHY
GEORGE B. FRY III

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DEPARTMENTS

5 EDITORIAL

7 LETTERS

13 ANSWERS

18 OUTLOOK

29 INTERVIEW
A conversation with Commodore's
Jack Tramiel

40 ESSAY
What about the rest of the people?

156 BOOK REVIEWS

175 GAMES

200 HARDWARE OF THE MONTH

222 HARDWARE INDEX

232 SOFTWARE OF THE MONTH

247 SOFTWARE INDEX

258 PERSONAL COMPUTING DEALERS

263 ADVERTISERS' INDEX

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Cover story begins on page 58.
Computer literacy: Who needs it?
How you can get it.



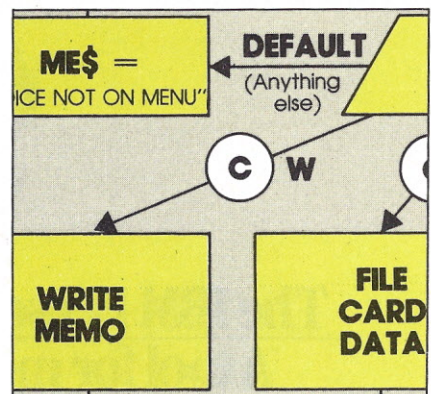
COVER



PAGE 51



PAGE 75



PAGE 125

FEATURES

**45 PROFESSIONAL/MANAGERIAL
 COMPUTING LITERACY: SPRINGBOARD TO SUCCESS**

By Jane Carroll

Fast-climbing young executives, adept at computing, are finding their new-found technical edge can help in the rough-and-tumble of business.

**50 BUSINESS
 SERVICING YOUR SYSTEM: BE PREPARED**

By Larry McClain

You've got a big job to finish when suddenly your computer breaks down. What will do you do? Here are several game plans.

**58 EDUCATION
 SQUARING OFF OVER COMPUTER LITERACY**

By Lee The'

In classrooms, offices, homes—practically everywhere—computer enthusiasts differ with computing enthusiasts over how we'll use the new machine.

**74 PROFESSIONAL/MANAGERIAL
 EXTEND YOUR REACH WITH TELECOMMUNICATIONS**

By David Gabel

The time will come when you want to talk to another personal-computer user. Here's what you can expect when you do.

**82 SPECIAL REPORT
 BIG FOUR ACCOUNTING SOFTWARE ROUNDUP**

By Robert Cubbedge

A comprehensive survey of the Big Four in accounting software—general ledger, accounts receivable, accounts payable and payroll—plus complete listings of available packages.

**117 BUSINESS
 BREAKING OUT OF THE PAYROLL BIND**

By Edgar Coudal

Small businesses are eliminating mounds of paperwork and armies of bookkeepers—and still delivering their checks on time.

**124 ADVANCED
 DESKMASTER: THE SOUL OF A PROGRAM**

By Leon Starr

The agony and the ecstasy of writing a new computer program. It can get you into programming, too.

**140 LEISURE
 HOME, HEARTH AND COMPUTING**

By Anita Seelig

Those young eyes that used to be tuned to TV in many households are now tuning in to a different kind of program—computing literacy.

How to put the big board on a small screen.



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CIRCLE 3

COMING NEXT MONTH

How Much Should You Pay For A Computer?

The cost will vary, depending on what you want to do with your new computer, but this guide can help you get the most for your money, whatever your needs.

The Shoemaker's Children

Guess what the big computer companies—like Apple, Radio Shack and Commodore—use to manage their own internal operations? Their own products, no less. We'll take a look at how they use them.

Hand-Held Computers

These small machines can be fun, and they're extremely useful, too. We'll examine them as they fit into the role of peripherals to your "main" personal computer—in the office or even at home.

Personal Computers In Sports

Personal Computers are making new inroads into the world of sports, not only in the front office but right on the field. There they can sometimes make the difference between winning and losing.

Cranking Up For Winter

As fall comes, can winter be far behind? We'll give you some ideas for using your personal computer to keep your BTUs from flying out your windows and doors.

Congratulations

You probably haven't thought about it, but you're really a very special person.

You're a forward thinker, a person who's always trying to get the best advantage he can. You're like many people who examine something new, see its potential for making things better, and really get into it.

You're specifically looking into personal computing. You're responding to your need for more—not in the selfish sense, but in the absolute sense—the need to do more, to have more, to be more. You believe that personal computing can fulfill that need.

People who want “more” are the trend-setters who help to launch a new product and stick with it to the top. And they do that not simply because they want “more”; they do it because they are dissatisfied with the way things are.

The only cure for that dissatisfaction is change—not mindless change to no specific purpose but change that we can control. That's what makes personal computing so appealing—its promise of control.

Anything that changes our perception of speed, distance and time grants us a new set of options that can lead to new and exciting concepts. We look at things differently. Any tool that broadens our outlook amplifies our capability; we are forced to reevaluate ourselves and that propels us to the brink of change.

Space travel has changed our perception of speed, distance and time, but it is still accessible to only a few. Airplanes have changed our perception of speed, distance and time, but their applications are still limited to a relative few. The automobile, by contrast, has proved a remarkable vehicle for the amplification of human capability. It has not only changed our perceptions of speed, distance and time: it is personally affordable and accessible; it offers the ultimate in control.

From 1910 to 1972, the automobile industry set the pace and the direction for the advance

ment of society. At its peak, one of every six American workmen earned his living in some way through the automotive industry. What was good for General Motors really seemed to be good for the country.

The changes born of personal computing will be even more profound than those brought about by spacecraft, airplanes or automobiles. While the latter amplify the potential of the body, personal computing amplifies the potential, and thus the power, of the mind.

That power is more than evolutionary, it is revolutionary. It will be harnessed only by those people who hope to translate its potential into public and private gain.

These are the people who want “more.” These are the people willing to expend the time, effort and money involved in personal computing because they believe it will best satisfy their need for “more.”

The only way that the people who want “more” will be able to get “more” through personal computing is to attain what we have called computing literacy. Literacy in the traditional sense allows its possessor to use language to get things done. Computing literacy allows its possessor to use computing to get things done. We've devoted much of this issue to just that—the attainment of computing literacy. Become computing literate, and you can get “more.” You will be able to participate with the forward thinkers who have gone before you in personal computing. You will have a new tool to really make a difference.

But there are no guarantees. You get from personal computing in proportion to what you put into it. That's what makes it a challenge.

The gauntlet of revolutionary change has been dropped. By looking into *Personal Computing*, you've picked it up. Carry it well.





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On E-Mail Connections

I read with interest Jeff Rothfeder's article "Electronic Mail Delivers the Executive Message" on page 32 of the June 1982 issue.

Unfortunately, the article leaves the impression that Source Mail and CompuServe's Infoplex are the only electronic-mail systems available to the personal-computer user. This, of course, is not the case. ComLaw's Connect electronic-mail service provides the personal-computer user with access to GTE Telemail. Normally, Telemail is available only to large users who pay a substantial minimum monthly fee. Access through Connect, however, requires no minimum monthly fee.

James A. Schriemer
VICE PRESIDENT, OPERATIONS
COMLAW
ANN ARBOR, MI

Your article "Electronic Mail Delivers the Executive Message" on page 32 of the June 1982 issue evoked poignant memories for me. Last November, I decided to become either a CompuServe or Source subscriber. I spent half an hour at my local Radio Shack store and one and a half hours at my local Computerland trying to get "on-line" without success. Subsequently, a further attempt at connection proved equally fruitless. In all instances, I was advised that the failure was

due to too many users trying to connect at the same time. I never did become a subscriber.

Potential subscribers would be well advised to check for service availability in their areas before parting with their money.

N. David Fay
ORANGE PARK, FL

THE PROCESS OF SELECTION

Like many of my colleagues interested in purchasing a word processor or personal computer with word-processing capabilities, I'm a bit overwhelmed by the variety of packages on the market.

Could you please direct me to an article or study that compares word-processing packages on a standardized basis?

Mark J. Nikceovich
FLOSMOOR, IL

EDITOR'S REPLY: Consult our word-processing roundup on page 82 of the August 1982 issue. That article compares various software systems on a number of characteristics. By the way, there's been a new entrant since that issue went to press. It's *Format II* for the Apple II, from Kensington Microwave, 300 East 54th St., Suite 31, New York, N.Y. 10022. The company's advertising claims that *Format II* will do everything *WordStar* does, and you don't even need to add CP/M.

THE MATHEMATICS OF PRINTER PURCHASES

As a typographer who uses computers in my daily work, I very much appreciate the way *Personal Computing* views the computer field. Right now, while there are many technically oriented periodicals, your publication fills users' needs for a magazine dedicated to their interests. It would seem that the majority of personal-computer owners are interested in the technical aspects of the machines, but I'm sure that there are a growing number of people who are more interested in what a computer can do rather than how it does it.

I have just finished reading the excellent article in your July 1982 issue surveying the printers available. While the article is most enlightening, I think the tabulation of machines could be more useful if there were some way to indicate "best buys." I have created a formula that I believe may help your readers make better purchasing decisions.

I want to point out, first, that my formula is not precise. It makes certain assumptions (which I delineate) that may not match the potential buyer's special needs. However, if the reader will pick out those printers that fit his requirements, my "value-factor" formula may be useful.

In all probability, the buyer will be purchasing a dot-matrix printer. In general, this type of printer is the least expensive. Next we must assume that the quality of the print output is important, and that the larger the size of the dot matrix, the better the letters will look.

We then come to the general conclusion that the type produced by a 9 by 12 matrix will be more readable than that printed by a 7 by 9 matrix. It is also assumed that the larger the matrix, the more versatile the printer, in that it will be able to produce various styles of type. We can then see that the 9 by 12 matrix has the potential of producing an overall coverage of 108 dots, and a 7 by 9 matrix will give a 63-dot pattern.

Finally, we must assume that the potential buyer wants to get the highest possible print speed, consistent with print quality. It is easy, then, to multiply the maximum dot pattern by the characters-per-second speed of the printer to get the dot patterns per second (dps). If you divide this figure into the cost of the machine, you come up with what I call the value factor.

For example, the Centronics 122, with an 11 by 8 matrix (88), is rated at 120 cps and has a dps of 10,560 (88×120). Since this machine sells for \$1195, it has a value factor of \$.1132 ($\$1195 \div 10,560$). In contrast, the Epson MX-80,

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LETTERS

with a dot matrix of 9 by 9, a cps of 80 and a price of \$645, produces a value factor of \$.0995 ($81 \times 80 = 6480$ divided into \$645). While the Epson would seem the better buy, there may be personal decision factors that would rule out the lower-cost printer.

It is interesting to note that, according to my formula, some of the seemingly higher priced machines are, in fact, lower in cost. For instance, the Qantex 6000, selling for \$1195, has a value factor of \$.0984. In any case, I thought your readers might find these calculations—which are the type that seem to please accountants—interesting and, perhaps, informative.

Lee Daniel Quinn
OLD BRIDGE, NJ

AN "ULTIMATE" ANSWER

I read with great interest Margo Downing-Faircloth's article "Personal Computing Pays Off for Property Managers" in the June 1982 issue of *Personal Computing*. Many industries are beginning to see specialized software packages being marketed for their needs, and real estate is at the hub of much of this activity.

There were some salient points in the article, especially regarding the development history of computer software packages for property management. Programming and design is certainly not a game for technical dilettantes. So often, in the past, just "having a bright idea" has served as the directing force for such planning and concepts. Bright ideas are fine, but it takes a solid background in not only data processing but real estate and accounting as well, to produce a quality property-management system.

Unfortunately, much of the data provided in the article was outdated and inaccurate. Excellent systems do exist. The growing popularity of using personal computers for business has, however, generated a new version of an old problem: A few firms, in their desire to "get on the bandwagon," offer lots of promises and not much else. The key phrase is, and always has been, let the buyer be aware.

The evolution of real-estate systems has also given rise to certain fallacies, some of which were echoed in Downing-

Faircloth's article. For example, systems are always designed to operate on only one type of computer; programs are not cheap, and cheap programs are suspect; automated communications always exclude those outside the organization; systems that deliver reports don't always deliver results; and what's coming next is always left up to the hardware vendor. Some other fallacies include the notion that personnel support is the most important ingredient and computerization is a risk.

Those statements just aren't true. Software can be portable—programs can be so designed that they will run on any computer. Software also can be both qualitatively and competitively priced. Remote communication capabilities can be a part of any small system if it's designed properly. Reports can be both working tools and press releases. And equipment changes don't need to obsolete your system if its physical operations are controlled by only a few routines that can be easily modified. Support is also important, but often the demand for it is merely an expression of inefficient programming and/or documentation. With excellent tools, the need for help diminishes.

There is no risk in a system that offers all this, plus a money back guarantee. We know this because we've got one. We've developed what we feel is the system of the future—URES, the Ultimate Real Estate System.

Bonnie A. Piddington
MANAGER, MEDIA/COMMUNICATIONS
COMPUTER CAPABILITIES CORP.
CHICAGO, IL

ONE DISK DRIVE FOR GAMES, TWO DRIVES FOR DATA

Your answer to the question on how many disk drives a personal-computer user needs in the June 1982 issue *Answers* column caught my attention. Our firm provides assistance to users who purchased software packages from a number of vendors. Primarily, mainframe computer users get such software in both source and object form, but an increasing number of software vendors are recognizing the needs of mini- and personal-computer users to have the same modification capabilities as large systems users. The vendors are thus beginning to offer source

code for a fee to these customers. We install, modify, enhance and upgrade such systems. And the storage capacity needs of these users is a concern at all computer sites.

Disk space is like a person's income. "No matter how much is there, our style of living (computing) will soon exceed it."

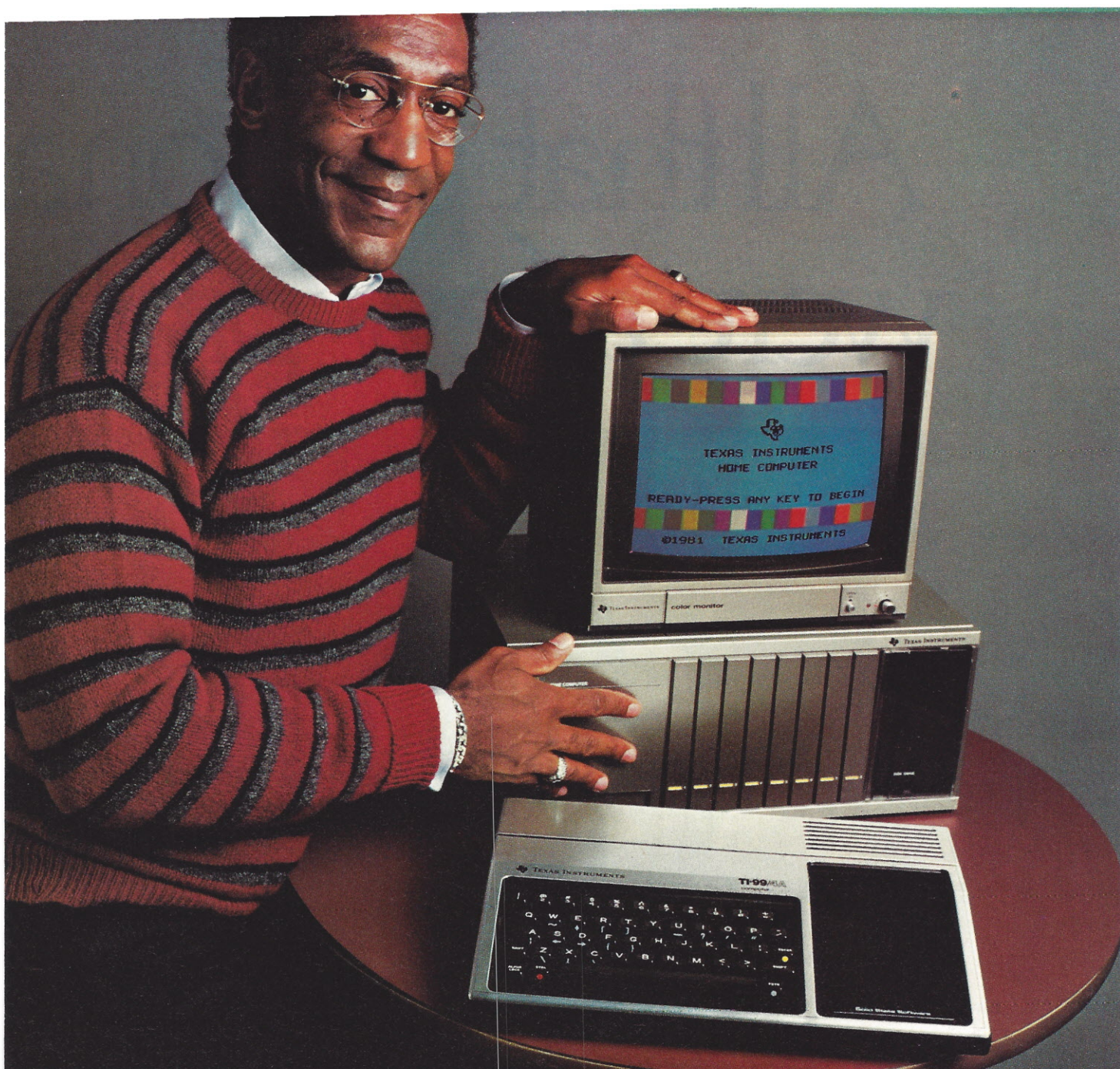
It is impossible to protect the data on a diskette if there is no way to copy it. And while software vendors are logically concerned about piracy of their products, the actual data (not programs) that a user quickly develops are far more valuable. The vendors even offer replacement programs for a nominal fee if the original programs are destroyed, but what does a computer user do if the cat, dog or children used the diskette for a toy, or an overly ambitious maid gave it a good feather dusting? Anyone serious about data processing and accumulating accurate computerized records must have some means of making copies of all those data. This could be done with a cassette or diskette, but there should be no reason to have to re-enter data manually.

Many first-time users are very concerned about the cost of their equipment and they tend not to give the cost of their time a great deal of thought. The media available on most small systems are far more fragile than the owners are aware of. Your publication, among others, is trying to educate them to this fact. Those of us who have lifetime careers in the various computer professions owe it to these new users to highlight the disasters that could happen before they find out the hard way, and therefore distrust anything we tell them after that point.

A beginning rule-of-thumb that we use on any file space requirements on disk is to allow at least twice the amount as the largest file. There must be room to sort the file, there will probably be work files generated with reports that will not be permanent, and the user will want more space as new uses are found for his computer.

So please do not recommend that a computer user can get by with only one drive, unless his only purpose is to play games and never use the machine to build data files.

William J. Grasser
VICE PRESIDENT
PROGRAMMING/MAINTENANCE INC.
HOUSTON, TX



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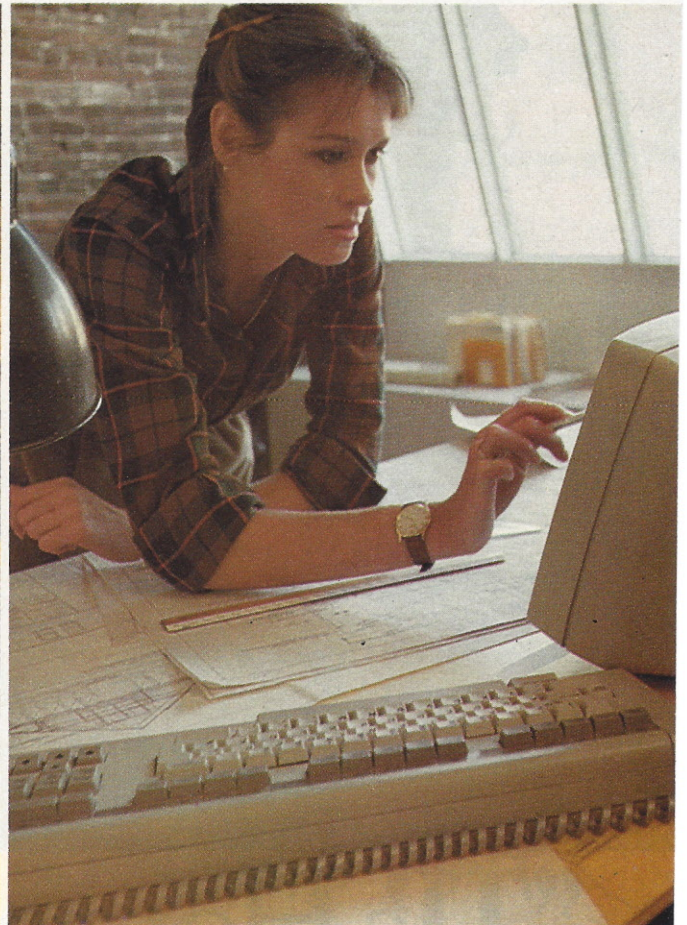
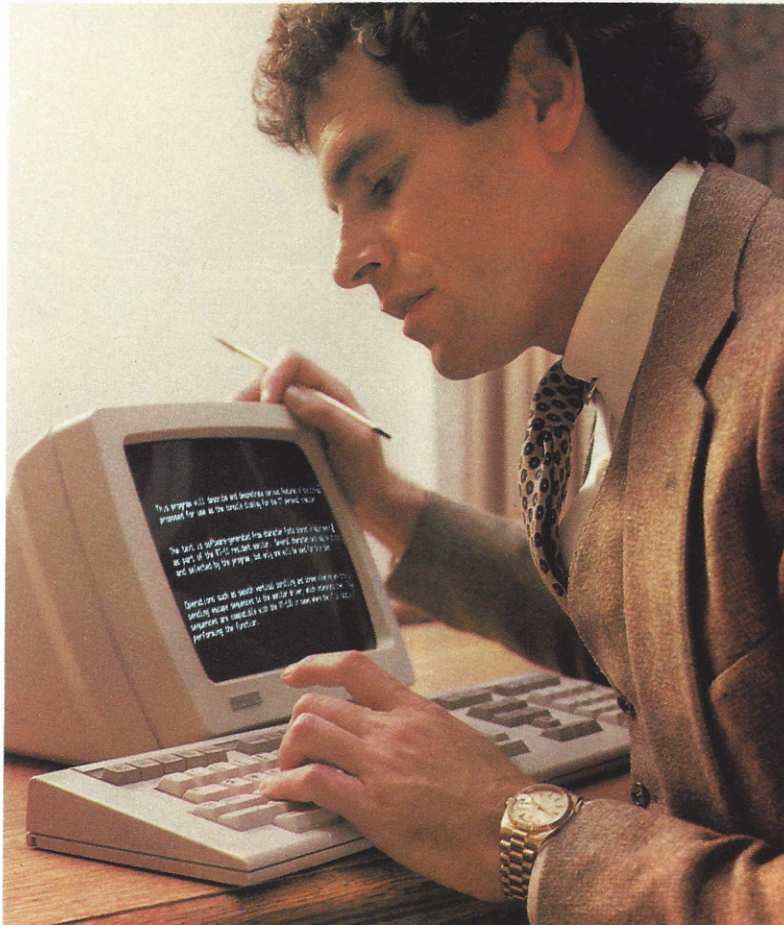
TEXAS INSTRUMENTS

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CIRCLE 5

All that persona were a few profe



Until now, manufacturers have made personal computers that were a hopeful compromise between home use and business.

But now Digital Equipment Corporation offers the first personal computers designed—and built—strictly for professional use. And since different professionals have different needs, Digital is introducing not one, but three personal computers made to professional standards.

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Computing At The Office... And At Home

In this monthly column, "Answers," we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q: I want to get two personal computers, one for my office and one for my home. Both must be able to run the same software so I can take disks back and forth from the office. The company is paying for the one at work, so I'd like that to be a real professional system. I'm paying for the one at home, so I'd like it to be an inexpensive system that can run business programs as well as home and educational programs for my family. What do you recommend?

A: The most likely candidates for your needs would include the Radio Shack TRS-80 Microcomputer Model III, the Apple II Plus, the Commodore PET, the IBM Personal Computer and a number of inexpensive business-oriented machines that all run the CP/M operating system, which gives you a pretty wide choice.

Each machine has flaws relative to your diverse goals. Of the named machines, only the Apple and the IBM support color monitors—an important plus for home/educational uses. But currently there's a lot more home/educational software available for the PET and the TRS-80 Model III than for the IBM, which is too new for much software to have been developed yet—especially in the home/educational area. And while the Apple II can be configured to a full business setup for \$8000 to \$10,000 complete with hard disk drive, it requires adding peripherals from several manufacturers, which

defeats the purpose of single-manufacturer responsibility.

Inexpensive CP/M machines like the Osborne I, the Cromemco Falcon and the new small Sanyo unit are very tempting from a business standpoint. The Osborne has an option that allows the machine to read and write disks for some other CP/M-based personal office machines. This allows you to have one of the other machines at work with the Osborne at home. In addition, there are more expensive Cromemco and Sanyo computers that would work admirably in the office. There is, though, a serious lack of home/educational software for these machines.

So if you take home applications seriously, you would have to purchase another system for those uses—such as a Radio Shack Color Computer, an Atari 400, a Commodore VIC 20 or a Texas Instruments 99/4A. None of these are software-compatible with any of the models on our first list—and once you added up the bits and pieces necessary to get enough on-board memory to make them truly useful, you'd be talking about at least \$600, plus the cost of a printer, which is at least another \$300 for a really minimal unit.

You could try to make do with one of these little machines in your office. But while there's a VisiCalc-like financial modeling program for the Radio Shack Color Computer, for instance, and it can be used for videotex with a modem to hook up with remote information services, Radio Shack would be the first to agree that its Models II and III are the ones for the office. However, Radio Shack Model II and III software packages are not compatible, and there's little or no home-type software on the II. So, as with the Apple, you're probably

going to be better off with two of the same model—in this case the Radio Shack Model III.

We'll suggest that even for your home machine you'll want a minimum of 48k of memory, one disk drive and at least a 50-column display on a good monochrome monitor, along with a reliable, inexpensive dot-matrix printer. And no matter which computer you go with, you'll end up paying about \$3000 for your home system. You can use your color TV for color operation.

You could save a few hundred dollars with an inexpensive thermal printer, and in the case of the Apple, a few more hundred if you forego the 80-column display option. That could get you down to around \$2500, but not less. And it would mean you could probably get a III for the office. But if you do a lot of word processing, you'll probably start missing the 80 columns of your office machine. You could upgrade the Apple easily enough, but you'll be back to the incompatibility problem.

For your office setup you'll probably want 64k of memory; at least two disk drives (one of them a hard drive); a high-quality, glare-resistant monitor; maybe both a letter-quality and dot-matrix printer, and a modem to hook up with remote information services. That would put you in the \$8000 to \$10,000 range.

Q: I've heard about new micro-disks. Are they for real?

A: Yes. Here is what looks like a genuine better mousetrap. The 5 1/4-inch diskette was an advance over the old 8-inch units because it's a lot easier to carry around and improvements in data density make it practical.

But in many ways the floppy is out

of place in a busy office environment. Floppies bend easily, they're too big to fit in a coat pocket, the slot that allows the read/write head access to the recording surface makes it susceptible to ruin by one accidental touch of a sweaty finger, and you can't just jam them into a disk drive—they have to be coaxed in.

Enter microdisks. They use the same soft plastic recording material as the 5 1/4-inch diskettes, but they're encased in a firm plastic cover about as hard as the material credit cards are made of.

And the open slot found on a floppy is covered by a metal plate that's automatically pulled out of the way after it's inserted (or jammed) into a disk drive.

Unfortunately, there seem to be at least two types of microdisks entering the marketplace—both around 3 inches across, both with the firm cover and covered slot. Sony has one, and a consortium of several manufacturers has the other.

Storage density seems to be comparable with that of many 5 1/4-inch disks—about average. But the microdisks are so much smaller that they're not directly comparable.

So keep your eyes peeled. The disk drives that use microdisks are very compact, and will be available for personal computers that use separate drives. Expect to see them appearing inside portable computers, too. It's a pity to see yet another media format coming into use. But this one is so exceptional, we think you'll approve.

Q. I travel so much I don't get as much use out of my computer as I'd like. What about the portables? Can they solve the problems of the traveling businessman who wants to compute?

A. We're getting there. The ideal would be to have all your business dealings resident on a hard disk storage system that you can access from your hotel room at any hour, finding out things, picking up and

leaving messages, firing up various programs and working with them. Unfortunately, we're not there quite yet, but so many people travel extensively that it will soon be profitable for computing companies to achieve this. But what's available right now?

Before you look at the market, look at your needs. You could go shopping, see a neat little computer for a few hundred and grab it, and then wind up with the thing in your desk drawer, unused. Going in with your needs unclear makes the same kind of sense as doing grocery shopping after a meal, not before.

The first need to assess is whether your prime use will be data inquiry. If it is, then some of the small units with tiny, calculator-style keys will be fine—though you have to be sure those little one-line displays are enough for you. But if you have to do any kind of vigorous interaction with the machine—extensive use of the keyboard, in other words—limit your search to those with keyboards that allow touch-typing. Several small ones—notably the Epson and the Grid—offer this. And, of course, all the bigger ones do (like the Osborne and the Otrona).

Second, you have to decide how compatible your portable must be with your office computer. It might not be too difficult if you do all your interactions through a third party like the Source, or at least via modem (telephone interface). For instance, we just received a transmission from a Xerox 820 computer operating in a CP/M operating system that went into an Apple computer with Apple's own DOS. There were some problems with spacing between words and special control characters used in telling the computer how to print text, but basically it worked.

However, if you want to really work with the home computer, downloading data, manipulating it and uploading the results—if you want to have swappable diskettes—you may be in trouble. Portable computers are

initiating an era that might be called supplementary computing. And for them to truly supplement your personal computing, compatibility with office units will be a major need.

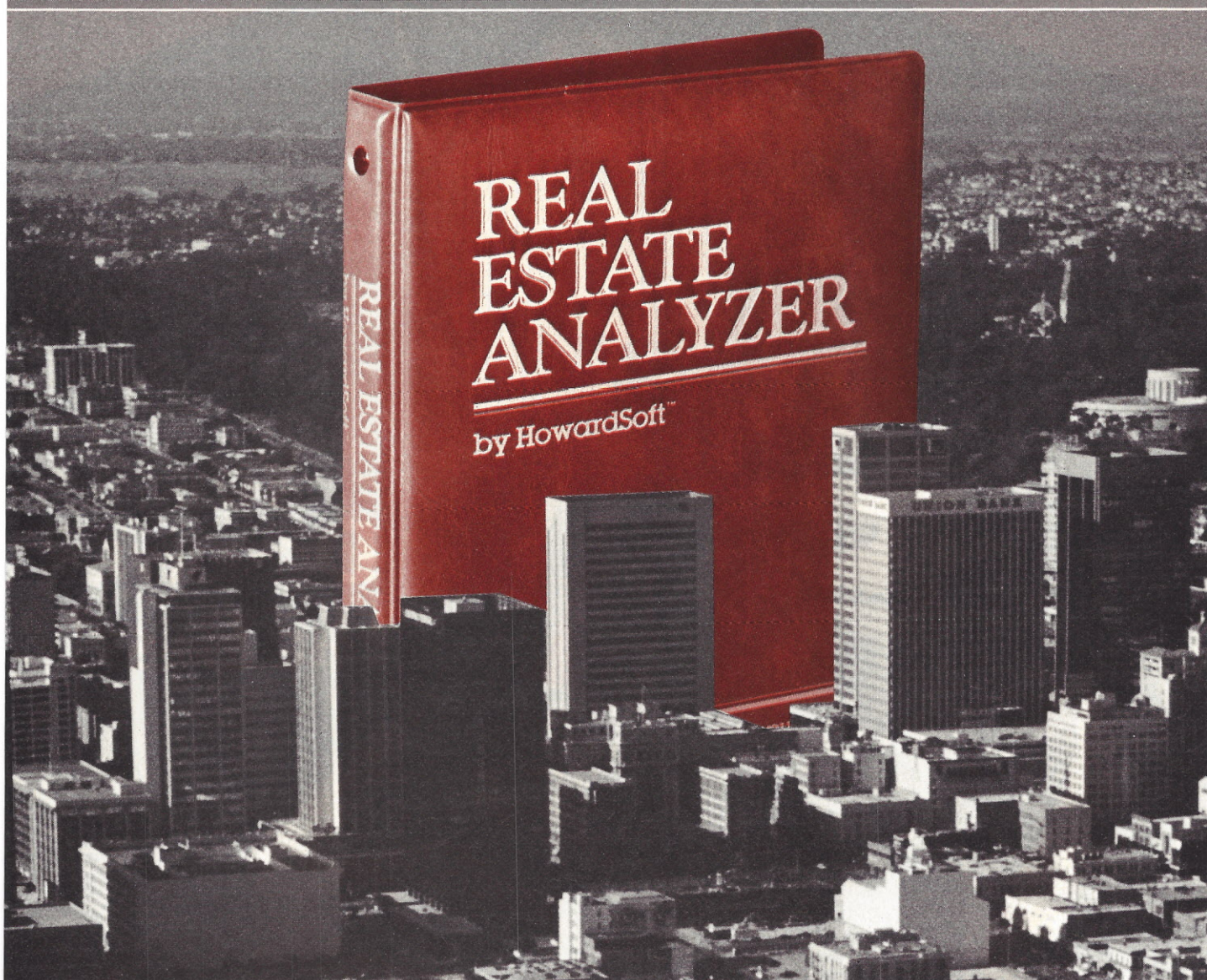
There is one simple way to solve this, right now. Use the portable as your main unit—just carry it around.

That would clearly solve the problem of compatibility. And some companies are providing their sales forces with Osbornes or similar machines to do just that. Better make sure, though, that you're willing to carry something that big around. And some parts of computers—notably the disk drives—can get touchy about being banged around. The diskettes have to stay clear of magnetic sources, too. Even a magnetized paper clip or a badly shielded cathode ray tube could give you grief.

Smaller diskettes and the implementation of bubble memory are making smaller computers possible. But not for Osborne prices, they aren't. Bubble memory stores data inside the computer without moving parts, and the memory remains even if the power is shut off. That's good, but you still have to get to a disk drive if you want to chunk out a lot of data, or carry around a lot of data, or pop in an application program—although the latter could be done with a ROM (Read Only Memory) cartridge on some machines. Computers like the Grid sell for around \$8000, and machines using bubble memory all seem to be going for the price of a subcompact car or more.

The next need to assess is your display requirement. If you're going to be doing a lot of computing, you're going to want to see about getting a full screen display. Right now, you seem to have a choice between a small cathode ray tube (CRT), a one-to-four line liquid crystal display, or a flat screen display. A multiline display gives most people a lot better "feel" than a one-liner. The flat screen displays are, again, expensive, and most of those (along with liquid

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crystal) won't show graphics—just alphanumeric data. The Grid has graphic capabilities, and, for its price, it ought to. But without getting technical, we just want you to be sure to sit down with the display (and keyboard) of whatever you're interested in and use it long enough to be sure you can live with it. "Long enough" means the same length as the length of your average computing session—no less.

A tiny computer can have as powerful a processor as the big job in your office, just as a small sports car could have as big an engine as the family station wagon. That doesn't mean you can take your family on a camping trip in a Midget, though....

Next—do you need battery power capability? You do if you want to use one in an airplane, or in a client's office. If you do need battery power, make sure that you evaluate the machine's ergonomics. With portable equipment you need to weigh your purchases carefully.

It's possible, though, that you may need transportability more than portability. If so, you should know that carrying cases are available for computers like the Apple, along with battery packs. The Apple can be converted to run off a 12-volt battery or cigarette lighter receptacle through a \$100 conversion kit from Cuesta Systems of San Luis Obispo, Calif. We have also heard of (but haven't seen in the stores yet) a little unit that combines battery pack, disk drive and a small display screen, all in a compact package. And MPC Peripherals of San Diego, Calif., has announced a bubble memory board for the Apple that would preserve its memory even with the power off. It will store 125k (125,000 characters) and cost \$875. Other computers such as Hewlett-Packard's HP-85 are very compact, although at the expense of having a cassette drive for memory instead of a disk drive.

So depending on just where and how often you want to do computing,

you may be able to solve your problem without recourse to one of the new portables. Keeping the same kind of system as you currently use, but in a transportable configuration, would solve all your software/diskette compatibility needs. You could even take your one computer from home to work and back again. Or you might consider getting a second computer for home—maybe with just one disk drive and no printer, or a really inexpensive one. Again, your compatibility problems are solved. And a diskette is far more portable than the smallest computer!

At the other end of the spectrum, if you anticipate making only short-term use of computing on the road, one of the new tiny portable terminals might make sense. But long sessions could run up a big enough phone bill to pay for the difference between one of these and a true computer that could download data quickly, and then let you process it locally.

The bottom line? Just as with full-size computers, the greatest hardware is useless without practical software. Any portable should have enough software available at the date of purchase to pay for itself in utility and productivity. And it should be possible to make it compatible with what you have in your office, one way or another.

Q: I was shopping for an inexpensive letter-quality printer, but a salesman recommended one of the new electronic typewriters with a computer interface. What do you think?

A: We hate to admit it, but even when you use a word processor regularly, short notes, addressing envelopes and similar small jobs are more easily done on a typewriter. Just as a Boeing jetliner would be underutilized if you used it to make a cross-town hop, so is a computer in word-processing mode underutilized for the little stuff.

Another use for the typewriter is as a security blanket. All machines break down, and if the computer's going to be in the shop for a few days (or weeks), the office typewriter could be a godsend. Some shops may have loaner computers, and it's becoming possible to rent them—but the former is a lot of hassle and the latter costs enough to make any sane man gulp.

There is an argument to be made for having the computer do all your printing jobs. You will surely become more proficient in its use if you do even the smallest jobs with it. It will make the bigger jobs easier. Just realize that there is a point of diminishing returns for your less arduous tasks.

Implicit in this discussion is that, in most cases, we're talking about the typewriter/printer for your secretary and the computer for you. If that's true, this might be the time to consider getting your secretary a computer, too. You could wind up turning a frustrated worker into a valuable assistant.

But you still might need a typewriter. Assuming you decide you do, and your letter-quality printing needs aren't too demanding, an electronic typewriter with a printer interface could be a smart choice.

But salesmen for these typewriters often caution against overusing them. A computer can run a typewriter to death; it tells the typewriter to print at a remorseless 150 words per minute or more. Even that's slow compared to what a normal letter-quality printer can do. So you run the risk of both wearing out the machine and not getting enough output. But if your letter-quality needs are moderate—if most of your work will go through a speedy dot-matrix printer—a dual-purpose typewriter/printer could be the way to go.

The main makes available seem to be Olympia, Olivetti and Triumph-Adler. You can also buy (from Medi-amix in Los Angeles) a rather ex-

(continued on page 196)

Software Now Subject To Favorable Tax Treatment

There are three kinds of favorable tax treatment available to buyers of computer software as the result of the new Economic Recovery Act. According to Coopers & Lybrand, a public accounting firm, the most aggressive method is to treat the costs of purchased, customized software as a current expense. Such costs are currently deductible for tax purposes if it can be shown that the risk of the usefulness of the computer software is borne by the taxpayer.

The taxpayer may also be entitled to a research and development tax credit for the software cost, according to David Oifer, a partner in the firm. To do that, he says, the buyer has to capitalize its purchase price and amortize it over the software's useful life. The Internal Revenue Service has attempted to treat computer software as an intangible asset if bought separately from hardware. Intangible assets are eligible for amortization over a short life, as opposed to being depreciated over five years under the new law.

Under a third alternative, if the software can be classified as tangible personal property, you can claim it for an investment tax credit or depreciate it over a five-year life. Oifer explains. To accomplish this, "off-the-shelf" characteristics must be identified, meaning the software must have been purchased as a standard package.

Oifer adds: "It clearly is in the interest of the taxpayer contemplating the purchase of computer software to review the applicable tax laws and incorporate tax planning into the contractual agreement with software vendors."

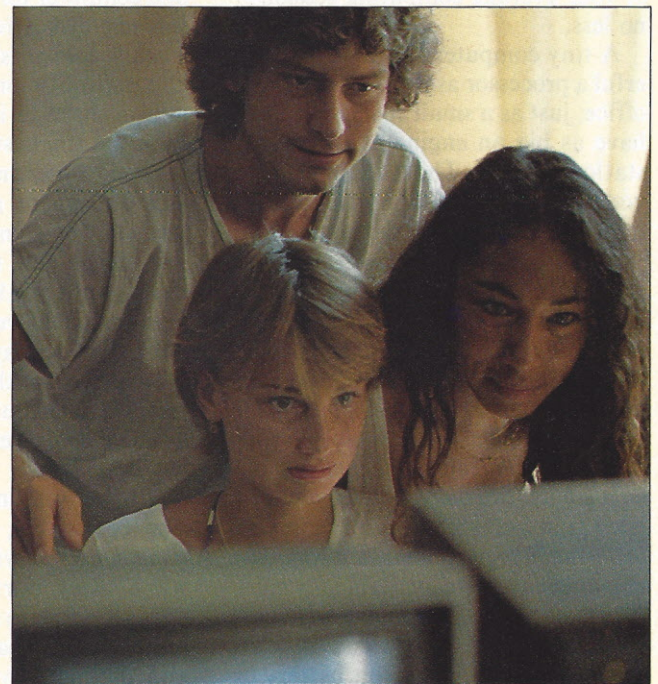
COMPUTERS IN THE CARIBBEAN

Three Club Med villages in the western hemisphere—Club Med-Caravelle (French West Indies), Club Med-Eleuthera (The Bahamas) and Club Med-Ixtapa (Mexico)—have adopted Atari 400/800 systems as their official computers. The popular vacation spots will feature computer workshops at no cost to vacationers. The workshop at Caravelle, with 25 computers, ranks as the largest in any vacation village.

Club Med staff members, trained by Atari, are on hand to introduce neophytes to computers and software, and guide more advanced members in further explorations of the world of computers. Games, graphics, programming tips, tutorials, programming languages and the like are available for browsing, entertainment or serious investigation.

"The home computer will become a major force in society in the future," says Serge Trigano, chairman and

chief executive officer of Club Med Inc. "By offering these workshops, we will be helping to demystify computers by helping our guests to understand the computer revolution."



Club Med vacationers being taught the ins and outs of personal computing on an Atari computer.

"Club Med villages offer a perfect setting for young people and adults to be introduced to computers," says Raymond E. Kassir, chairman and chief executive officer of Atari, Inc. "We believe these computer workshops will help people begin to understand the exciting applicability of computers to our everyday lives."

IT HELPS TO COMPUTE

In this technological era, this scientific age, this engineering Olympus, a bewildering number of American university students are still illiterate in mathematics.

"The number of college students in remedial mathematics classes is up 72 percent since 1975," says Gary G. Bitter, professor of education at Arizona State University. "Right now, I understand 16 percent of the college level mathematical science students in this country need remedial math."

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PILE ON THE PERIPHERALS.

Because the basic cost of the 64 is so low, you can afford to buy more peripherals for it. Like disk drives, printers, and a telephone modem that's priced at around \$100.

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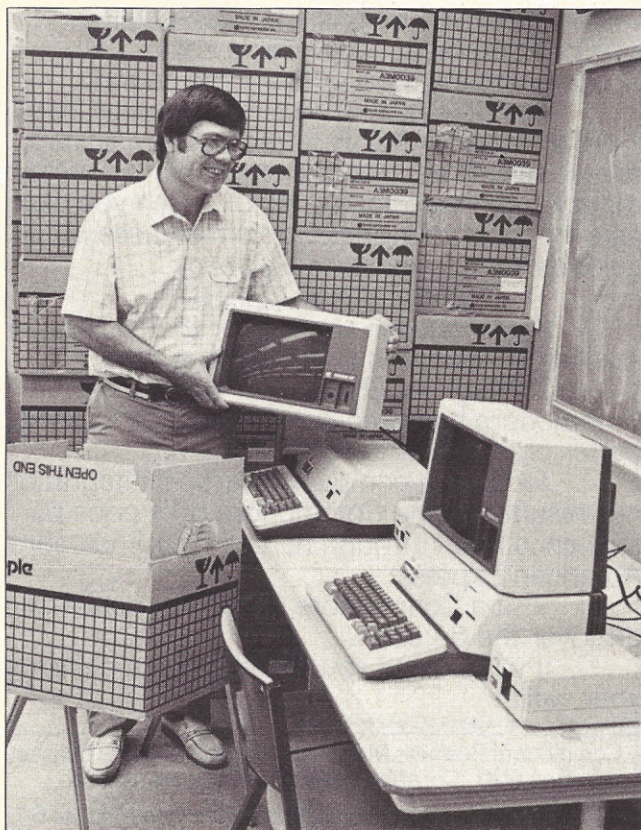
PC-S

OUTLOOK

As a result, universities, already pinched in a tightening economy, are forced to use precious resources and over-worked faculty to teach high-school math to college students.

Bitter, Arizona State and the Apple Education Foundation are combining resources to do something about it—they hope. The foundation has sent the university 30 Apple III personal-computer systems and appropriate software for Bitter to use in a three-year research project that will test computers as teachers of remedial math. The project represents a \$150,000 investment for Apple.

Bitter says the computers promise to be ideal teachers—tireless, patient and consistent. They can be programmed to identify and focus on each student's individual weakness, give tests, analyze the results, devise personalized study plans and keep records of each student's progress.



Gary Bitter, education professor at Arizona State University, unpacking Apple IIIs to be used in the school's math program.

The questions remain: Will students accept and learn from a plug-in instructor? And, if so, will the students remember what they learn?

Beginning this fall, the Apple III computers will give mathematics achievement tests to all students entering

the elementary education major at Arizona State. Those who score better than 70 will be excused from tutoring. Those who score between 50 and 70 will be categorized as Level One remedial and those scoring below 50 will be classified as Level Two remedial.

The computers will divide the remedial students randomly into three treatment groups. One group will participate in computer-guided instruction, a second will have a combination of computer instruction and independent study, and the third group will have only independent study. At the end of the program, the computers will re-test the students to determine which scheme worked best.

But test scores aren't all that matter. Bitter will interview the students to see which plan they like best, and he will re-test the students in 1985 to see which groups best remember their math skills.

In addition, Bitter will be looking at some more general questions. He hopes to determine which computer programs best improve learning skills apart from the computer, what subjects and objectives are best for simulation and modeling activities using the computer, what types of programs encourage creativity, whether drill-and-practice programs increase achievement, whether computer programming improves problem solving abilities, what effect sound and color have on achievement in computer-aided instruction, and the most effective ways of presenting computer-aided instruction.

OHIO FARMERS ORGANIZE TO BECOME MORE PRODUCTIVE

American farmers are among the most productive workers in the world. They are also keen businessmen, working within margins so slim that many wonder how they make a living at all. But they do, and now they're buying personal computers to help them do it even better. For the farmer, these machines hold the promise of increased productivity and efficiency in his fields, in his barns, and, perhaps most importantly, in his ledger books.

Unfortunately, not all farm computers are fulfilling their promise. Farmers are buying an abundance of incompatible and rapidly changing hardware but apparently getting little support in the way of software, service or documentation.

To ease the shortfall, a group of Ohio farmers have banded together in a unique and possibly historic approach to the problems associated with the use of on-the-farm computer systems. "Computing Farmers of Ohio" is an organization that has as its sole purpose the promotion of effective farm computing. It doesn't seek to sell anything. Its role is simply to achieve for its members collectively what they cannot do individually.

The main objectives of the organization fall into three areas. The first of these will be an effort to encourage the

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OUTLOOK

development of effective farm software. Six committees will oversee the establishment of software guidelines for dairy, swine, beef and various crops, in addition to guidelines for financial enterprise analysis for the total farming operation.

These six committees will be made up of full-time farmers as well as experts in the fields of farm records and production. It will be their task to define the needed software for their particular enterprise, as well as draft minimum standards for that software. These same committees will also oversee the review of privately developed software in order to determine whether it conforms to these standards. Software packages meeting the established standards will be approved by the organization for use by its members.

The second objective of the organization is to develop educational programs for farmers in all areas of farm computing. An early project will be the acquisition of a dozen computers to be used, on a rotating basis, throughout the state in conducting adult education classes on computer programming and related computer topics.

The association's third objective is to organize group purchases of hardware and software. Association members see the movement toward 16-bit microprocessors as a major step toward improving on-farm systems. They hope to implement their first purchase in the fall, after the expected introduction of several additional 16-bit machines. While they do not anticipate a group purchase of only one brand, they hope their organization can allow a greater exchange of ideas between farmers who own specific brands and models.

In addition to farmer members, the group is seeking a broad base of associate members from related agricultural businesses and organizations in an effort to create a true farm computer organization. The group feels that its resources can best bring about the development of much needed software; encourage an effective educational program; act as a forum for the review of hardware, software and associated services; and, finally, provide a mechanism for the exchange of ideas, experiences, solutions and information between agricultural users of computers.

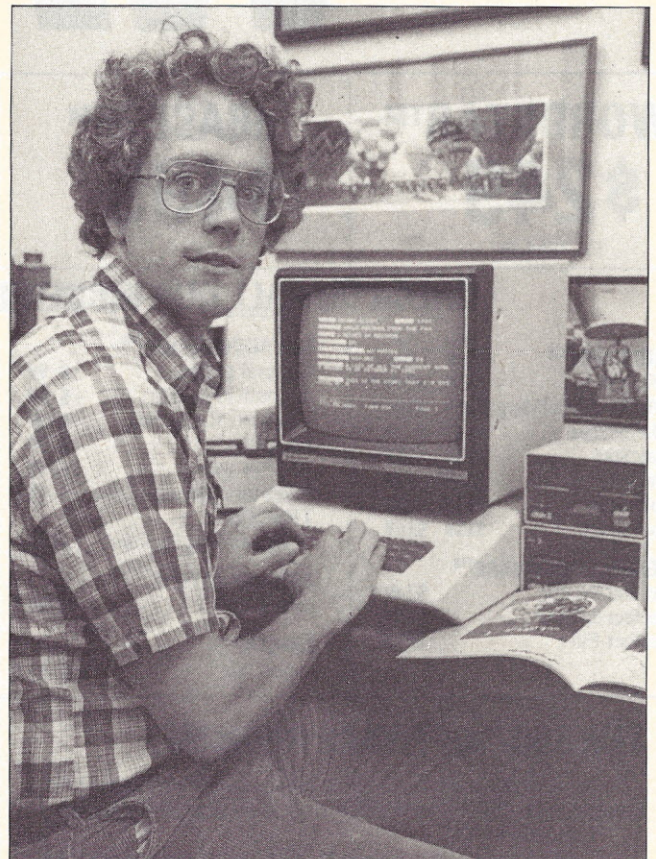
An effort is underway to stage a statewide meeting of members in mid-winter.

For more information on Computing Farmers of Ohio, contact John Reese, president, Box W116, 105 Maple Dr., Alexandria, OH 43001; (614) 924-2801.

SOFTWARE BRINGS READER SURVEY DOWN TO EARTH

Brian Lawler, editor of *Ballooning* magazine, was up in the air about what readers wanted from his magazine. Now Lawler is confident that he is giving the people what they want because he has their opinions stored safely away in his personal computer.

"We've always done reader surveys to make sure that *Ballooning* was publishing articles of interest to balloonists," says Lawler. "In the past, though, we had to assemble all the collected information by hand. It took days to put together a report."

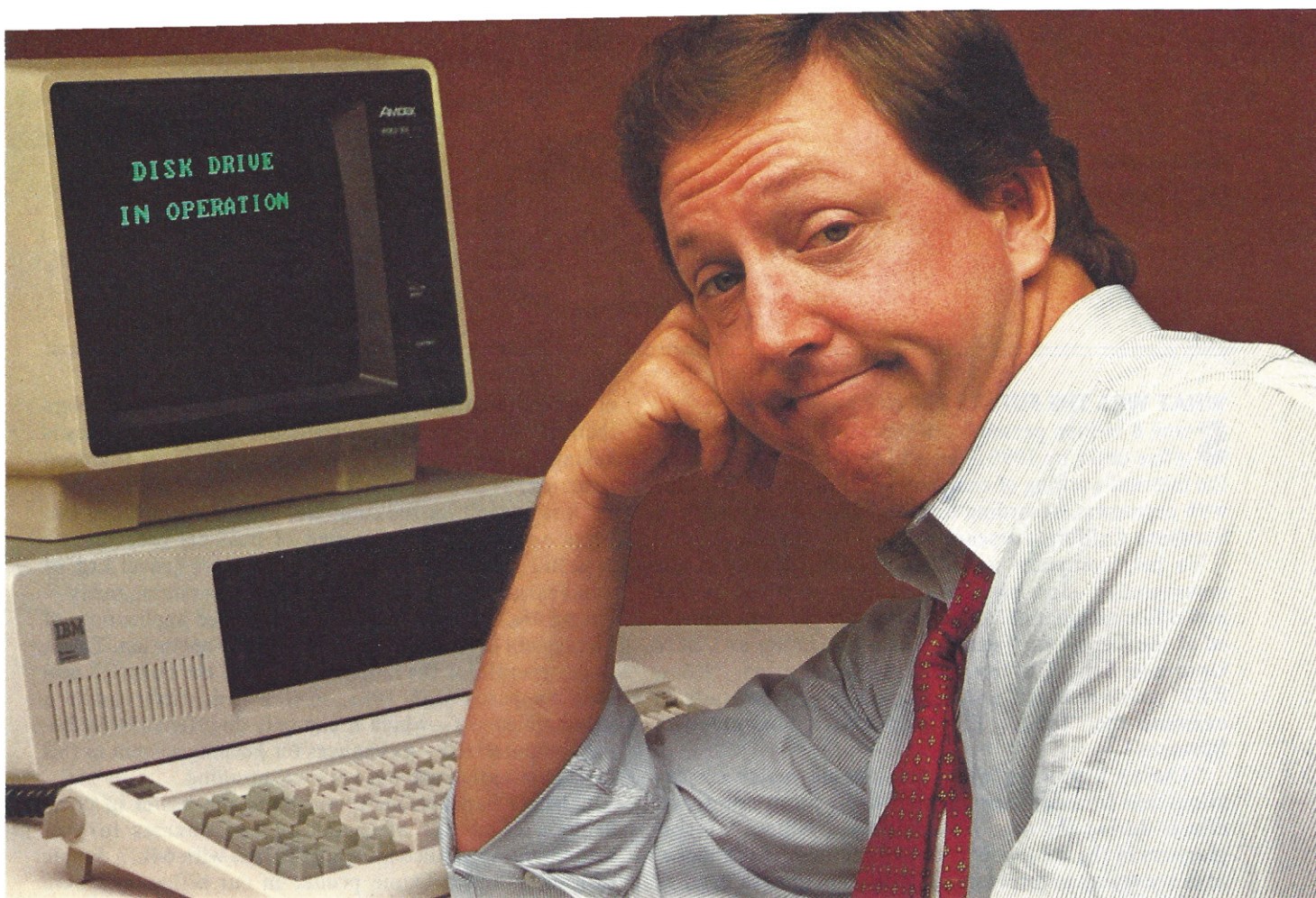


Brian Lawler, editor of *Ballooning* Magazine, inputting reader survey responses on his Personal Filing System data base.

All that changed last September when Lawler installed an Apple II computer with PFS (Personal Filing System) and PFS:Report software from Software Publishing Corp. of Mountain View, Calif. Now he sends out reader questionnaires, uses a form he created with PFS to key the data from them into his Apple, and compiles all the data into accurate reader profile reports.

"We can come up with a printed report containing all the information we need in a couple of hours using this system," Lawler explains. "Not only is it quicker, but it lets me handle larger numbers of responses than would be possible manually."

Another form Lawler designed gives him access to printed reports on *Ballooning* articles cross-referenced according to subject, author, photographer and publication date.



Microsoft's RAMCard™ with RAMDrive™ takes the whir, click and wait out of the IBM PC.

Solid State Disk. When you add the Microsoft™ RAMCard to your IBM® Personal Computer, you also add RAMDrive, which lets you use memory as you would normally use a disk. That gives you "disk access" that's typically 50X faster than disk. Without the whirring, clicking and waiting of mechanical data access.

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OUTLOOK

WHAT WILL THE FUTURE BRING?

Some 8 million personal computers will be situated on office desks by 1990. This will profoundly affect both the internal working of companies and their relationships with customers, according to Jack Nilles, a University of Southern California researcher.

To help computer users and vendors deal with the opportunities—and possible disasters—inherent in this new office automation, a two-year study has been launched at the Center for Futures Research (CFR) at USC's Graduate School of Business Administration. Nilles, CFR senior research associate, will direct the study to examine the "Future Effects of Microcomputers on Business."

"There's a growing awareness among major corporations that personal computers are likely to have profound effects during the next 20 years," says Nilles. "Market planners in the computer and telecommunications industries are trying to forecast the patterns of growth in hardware, software and services. Strategic planners in organizations using computers are trying to anticipate changes in productivity, training, communications and organizational behavior produced by the small machines that will make up a major portion of office automation."

The USC study will review existing corporate information management policies and examine alternative organizational futures involving personal computers. In addition, the study will identify the critical features required of the technologies presented to the users.

Among the organizations that have already agreed to sponsor the USC study are American Telephone and Telegraph, ARA Transportation, Fairchild Semiconductors, Northrop Corp., Safeco Corp., Xerox Corp. and the U.S. Postal Service.

Representatives of the sponsors will serve on a research council to help define the scope of the study and help select critical issues for examination. In addition, sponsors will have early and continuing access to all data generated by the study.

Human attitudes and needs will be a primary focus of the study. "Technology may change rapidly," Nilles says, "but people don't. There's always the problem of fitting the technology to the needs and attitudes of its users. The history of computer applications is filled with misadventures resulting from poor adaptation of the machines to people and the proliferation of computers multiplies these possibilities manifold."

COMPUTER SPELLS S-U-R-V-I-V-A-L FOR TRAVEL AGENCY

One segment of the economy that is bearing the brunt of airline price wars and the recessionary plunge in the discretionary income is the U.S. travel industry. The service nature of this business has placed it at the mercy

of the competitive whims of carriers, hotels and travelers themselves. As a result, the contemporary travel agency is keying on the computer as the linch-pin in its financial structure.

"If it weren't for the computer system we installed two years ago to handle a myriad of business procedures," says Bill Dias, manager of Robert Henri Travel Ltd. of San Francisco, "we would have trouble surviving today—but we are, thanks largely to the expanded applications of this system in virtually every area of our operation. Ticket prices overall for the industry this year are down 27 percent compared with 1981, so if a firm can't handle a volume business—which it can only do efficiently by being computerized—its chances for keeping solvent in this market situation are not very encouraging."

"Once I had personally mastered the basics of operating a computer after taking two courses in programming, I installed an Apple II Plus with 64k, a double disk drive and a Qume printer in our office. We were immediately able to cut 50 percent of our paperwork load, reduce input requirements to only one person, and simplify our information handling procedures at every level."

With air fares slashed to the bone, the average agency working on a standardized 7 to 9 percent commission has to sell 2.7 tickets in 1982 for every single ticket it sold last year. This does not even take into account the 20 percent refund transaction rate on sales. To handle this kind of volume affordably, computerization is often the difference between profit and loss.

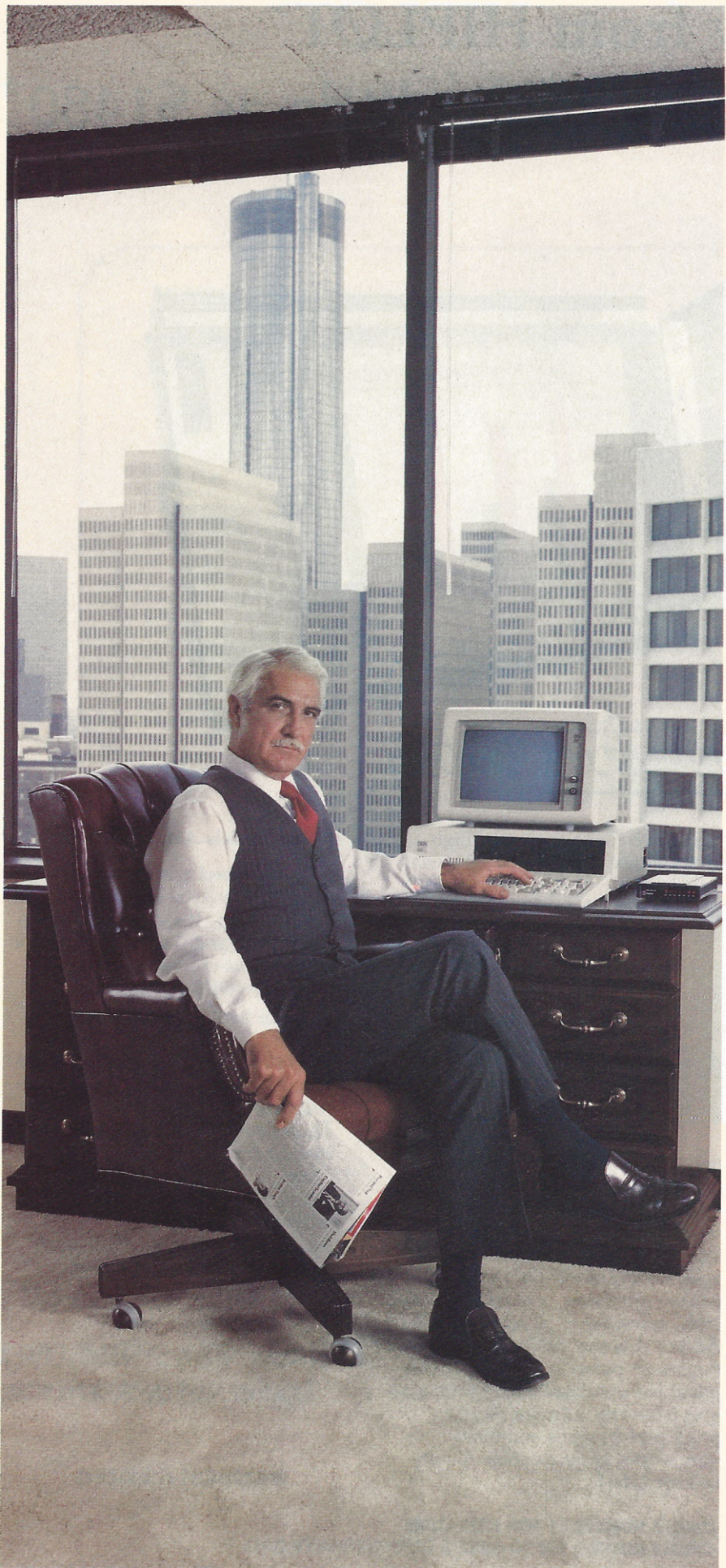
The focal point of Robert Henri Travel's computerized solution is its DB Master file management system from Stoneware Inc. of San Rafael, Calif. According to Dias, their DB Master system was able to take file drawers of information and merge them into an easily accessible storage facility of all the basic data which a travel agency must have at its fingertips. "For the first time," he says, "we were able to immediately search for information, check it against other data, merge that information and refile it for retrieval at a later time, and all in a matter of moments instead of hours."

NEW WAY TO BUY SOFTWARE

One of the persistent problems facing the personal-computer industry is software—its availability, its distribution, its demonstration at the dealer level. Dealers often feel they can't afford the time to demonstrate software properly, so the prospective customer never gets a chance to appreciate what a package can really do.

Or a dealer may not be able to afford to stock a wide variety of business software in these days of tight credit, so the customer has to settle for a package the dealer has now, simply because it's available.

Soft-Link, a new software-publishing company, thinks
(continued on page 176)



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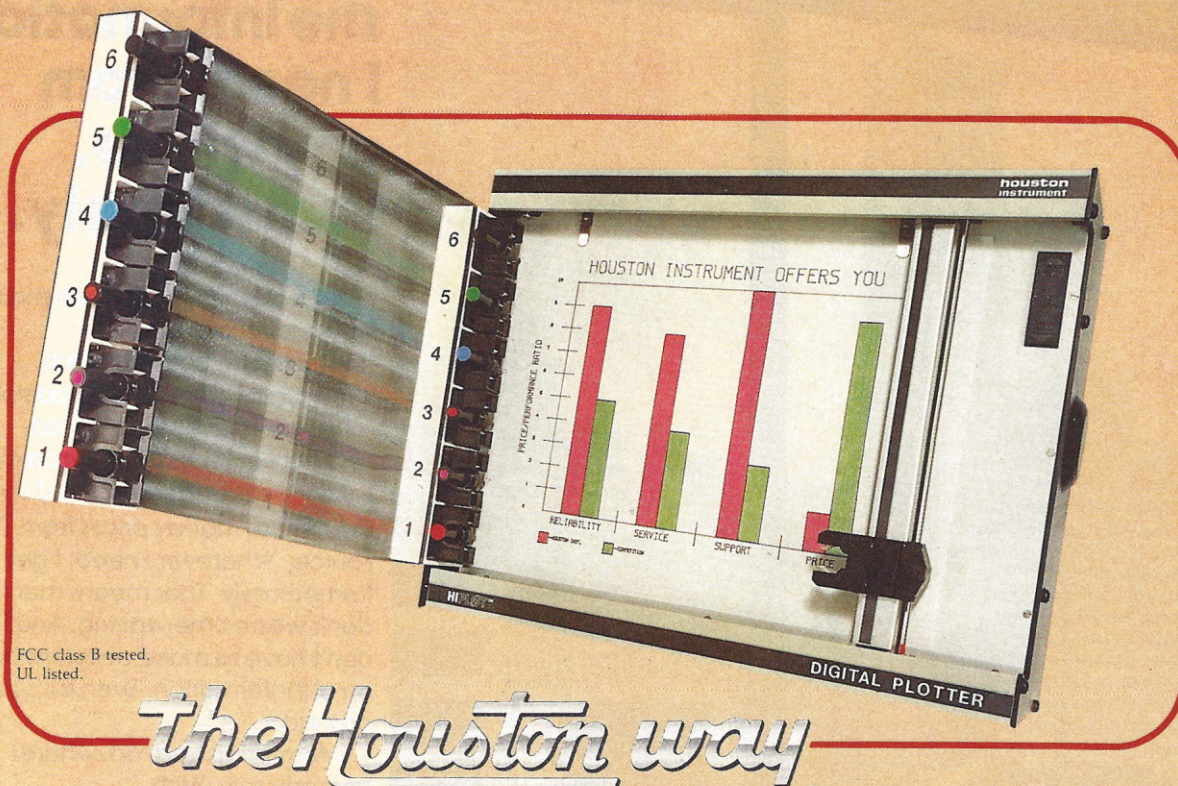
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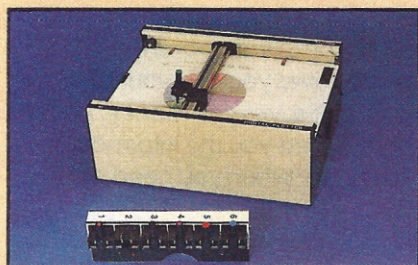
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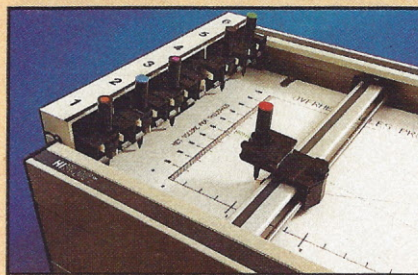
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An Interview With Jack Tramiel

Jack Tramiel is a hard man to pin down. The founder and vice chairman of Commodore Business Machines, he is always on the go. Because of the way he has been able to keep his company growing—while others in the same industry have foundered on the rocks of economic difficulty—he has been called “the survivor,” a nickname that applies equally well to Commodore itself.

He comes by the appellation honestly. Born in Poland before World War II, his first survival experience came in a concentration camp. Emigrating to this country immediately after the cessation of hostilities, Tramiel drove a cab for a while, and then got into the typewriter-repair business in Brooklyn.

But Jack clearly wasn't a man to run a small business. He quickly parlayed the typewriter-repair operation into one that assembled and sold adding machines in Canada.

By the late 60s, Tramiel had expanded his marketing operation into the U.S., and he was also selling calculators that had been made in Japan. It's said that he was the first to envision a calculator that could sell for \$10 in a drug store.

By the mid-70s, Commodore was manufacturing calculators here and abroad. Then came the crunch. Commodore was an “old-line” company (if the phrase can apply) caught in the oversupply of calculators and trying to make it in the face of aggressive new competition. A lot of companies folded, but not Commodore, the survivor.

Most successful people learn from their tribulations, and the lesson Tramiel learned was that he had to integrate vertically. So Commodore shortly bought MOS Technology, a semiconductor manu-

facturer in Pennsylvania, and Frontier Electronics, a semi house on the West Coast.

One of the products belonging to MOS Technology was the 6502 microprocessor, then in development. Sensing the importance of this small piece of silicon, Tramiel supported it with additional funding, and it is now the processor in the Commodore PET computer, the Apple computer and the Atari 400 and 800. Tramiel has also been called, “the father of the 6502.”

“What can a personal computer be used for? Anything you want it to do.”



Could you tell me a little bit about yourself and how you came to be where you are today?

Tramiel: You said I'm an important guy in the industry. You should know all you need to know by now.

I do know quite a lot about you. But I'd like to go over it some to make sure I've got it straight.

Tramiel: What for? Anyone who wants to know about me can read the same magazines you've read.

That may be true, but we have a bunch of readers—nearly 200,000 in all—many of whom are fairly new to the personal-computing industry. You're a leader in that industry and a person whom we think many of our readers would be interested in. That's the only reason I'd like to get some of your background.

Tramiel: Dave (an aide) will give you that.

OK, fine. Let's talk a bit then about your philosophy on personal computing. Commodore seems to have a different kind of philosophy from other companies in the personal-computer field. Can you tell me, for example, what kind of attributes computer users are going to want in years to come? What kind of capabilities these people are going to need?

Tramiel: Well, to do that, I guess I've got to give you a little background. We are a perfectly integrated company. Our aim is to sell components. To be able to sell those components, sometimes we have to have end products. So we, as a company, designed a computer back in 1976 and I asked the same question as you did just now. What can a personal computer be used for? At that particular time, I was told that it can do anything and everything you want it to do. And I can still give you the same answer today.

INTERVIEW

Anyway, we decided at that time to produce a product—in 1976. We introduced the product in January 1977 at the Consumer Electronics Show in Chicago. We still didn't know specifically what the computer was going to be used for. But, as we spoke to people like you and others, we were constantly being asked when could we deliver the product. So we finally told them all to "get in line, send the money in and as soon as your number comes up you will get delivery."

In one month's time, we received over \$3 million in checks. We knew then there was a need for personal computers because people wanted to buy them; there was money in the bank. That is the way we got into the business. And that is the way we still are today—selling, manufacturing, improving, making better personal computers than ever before. There are no secrets in personal computers. Everybody knows what they are being used for, and every single day new applications are being found.

OK, so new applications are being found, but what is the dividing line, for example, between the computer that is useful in the home and the computer that is useful in the office? Or is there one?

Tramiel: They are the same machine, but a machine that has 2k of memory definitely cannot be used for many business applications. Those are the types of computers you use at home because they cannot calculate very big numbers. So it has to do strictly with the capacity and the features of the machine itself. But the computer, as such, is the same.

Well, how do you define the computer then? What is your definition of a personal computer?

Tramiel: The definition of a computer is a product which you can calculate on. You can use it for alphanumerics. And whatever you put in, the computer stores it, either in the machine or on hard disk or on floppy disks. And it is a tool that you can use for

many different purposes, including education, home, fun, and also to do your homework which you did not do in the office. You can do it at home. Now, as we are getting into a modem product, you can buy a computer for as low as \$300, and you can hook it up to a mainframe computer and have millions of dollars of computer power in front of you at home and use it in the same way as the biggest corporations that are spending millions for the same thing.

Looking at your product line, it is pretty clear that you are aiming at a broad spectrum of users, from the very low-end user all the way up to the very sophisticated personal-computing user. Do you find that people buy one kind of computer, based on

"We told them, 'Get in line, send money, and (when) your number comes up, you'll get delivery.'"



price, and then expand it, or do they tend to look for the lowest cost they can get?

Tramiel: I can only tell you that there is a company called Rolls Royce, and they make one kind of car, for one type of clientele. And there is a company called General Motors, and they make a broad line of cars for everyone—for the young man, for the old man, for the wife, for everybody else. We do the same thing with computers. We sell them to everybody.

I've been told that you expect to sell a million computers this year. Is that true?

Tramiel: Yes, but I don't think that's a lot. A hundred million would be a lot. I see the industry itself selling 50 million computers a year by the end of 1985, of which I hope we will have a significant share.

That's an awful lot of computers, 50 million. Compared to an installed base right now of what—something like maybe a million and a half or two million? That's incredible.

Tramiel: Why is it incredible?

Well, that's a 25-fold increase in three years. That's pretty remarkable.

Tramiel: Well, if you would really look into it and see how many children today go to computer science classes, as compared to how many went five years ago, you'll understand why.

It's that much of an increase?

Tramiel: That's right. So we in the industry, I hope, will service these children who are coming out of school by bringing products, tools to these individuals who have already learned to use them in school.

So it's kind of a self-fulfilling thing? Children are learning more, so the interest grows.

Tramiel: That's right.

You're selling your VIC now for what—\$299? Is that going to drive the price down even further?

Tramiel: Again there's a Rolls Royce that is being sold for \$150,000. There is a Toyota being sold for \$5000. They are both cars and they are both

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INTERVIEW

doing the job. So it's different cars for different uses, for different needs, and it's the same with computers.

But prices in the automobile market have been going up year after year. We're talking now about the computer market.

Tramiel: Computer prices are not going down either. The mainframe did not go down in price. It still costs \$1 million.

But you get more function for your dollar now.

Tramiel: That's right. And you get more function for your dollar in a car, too.

Does all that mean then you're a fan of the computer-literacy craze that's going on right now in the schools?

Tramiel: Yes.

How do you define computer literacy?

Tramiel: People should know how to use a computer to learn as much as they can. That's why they go to school.

Now then, these people—after they leave school and they have learned as much as they can—are going to be the people who go out and say, "I'm interested in a computer."

Tramiel: This will happen while they are still going to school. They will try to show off to their peers, to their parents, what they have learned in school. You see, we have today approximately four million kids who are our salesmen when it comes to selling computers to their parents. They are the best salesmen the industry has, the youth of the world. No industry in the world ever had so many salesmen without pay. That's because they have learned something, and now they can actually go to their parents and tell them: "I've learned something that you didn't. And I know more about this product than you do."

Doesn't that frighten the parent?

Tramiel: Yes, but he is proud at the same time. And he wants to learn now—together with that young man or young woman—how to program, how to use the computer, instead of

the child being out in the street, or getting into fights, or being on drugs or whatever.

So this leads to the phenomenon I've been hearing about—the children dragging their parents into the computer store and saying, "Look at this, I want this?"

Tramiel: Oh, you've heard about that? Well, that's correct.

So the first time the kid comes in and looks, the next time he brings his Dad and the next time he brings his Mom—is that the way it works?

Tramiel: The child does not come in to look because he has already seen the computer in school and used it in school. He knows what he is coming in for. He just wants to convince himself that it is the right price, that he

"People should use a computer to learn as much as they can. That's why they go to school."



can tell his mother and father it is available here, and, "this is what I want to buy." You know, it's like in the old days—you always took your Dad when you bought your first car. Now you take your kid when you buy your first computer—the ultimate role reversal.

Why is it that kids take so quickly to computers?

Tramiel: Maybe they are eating better food than we used to.

Is it just natural curiosity—or is it maybe that they're not as intimidated?

Tramiel: I definitely believe that a young mind, a young person, learns faster than an older person, and here he has the first tool which, if you make a mistake, doesn't laugh at you. You can try it again. And the child loves to learn through the computer because, like you say, he doesn't get intimidated, and the information the computer has is 10 times the amount the teacher has, and it's 10 times as patient.

OK, let's move on a little bit now. Commodore is the real giant in the personal-computer field in Europe, isn't that right?

Tramiel: We sell a few machines there, yes.

Well, I think you're being very modest. You have actually cornered the market there, haven't you?

Tramiel: Well, we are quite successful in Europe.

What are the differences between personal computing in Europe and personal computing here?

Tramiel: There is very little difference. But with no question, timing in everything is very important. I felt that in 1976, 1977, the United States and the world were not ready yet for a home computer, or for such a thing as a personal computer, because it cost \$2000 then, or in that range. And anything that cost between \$1500 and \$2000, I felt, not too many families or not too many individuals could afford to buy. Everything was supposed to be ticketed "to sell to the

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INTERVIEW

masses, not to the classes." So \$2000 to me was to the "classes." We felt that our computer—which was an integrated computer, a total package—was essentially a computer that could best be used in business. And there were not very many companies in the United States in '77 that were capable of selling computers to businesses, because there were just no computer stores. Because there was really very little product at the time.

At the retail level?

Tramiel: That's right. In Europe, there were and there are hundreds of outlets serving the office with electronic products like typewriters, copying machines and invoicing machines, which never took off here in the United States. We already had quite a well organized distribution system in Europe, so we went to Europe with our personal computer and the machine took off automatically.

We then felt that if we could offer it to the masses at a price that the masses could afford, we could really have a blitzkrieg. And the VIC 20 was that first product we were able to sell to everybody. And the same success we had in Europe, we now have in the United States. We are selling today thousands of machines in the United States, more than any of our competitors at the present time.

So you are selling more computers than Apple is?

Tramiel: Yes. Not only more, but twice as many—or more.

You're talking, of course, about machines of all classes, all the way from the VIC 20 to the CBM?

Tramiel: All computers, yes. So our success in Europe now carries over into the United States.

But it is a different end of the spectrum, isn't it? You said in Europe you were selling a business machine and here your success is largely due to your VIC 20, which is your low-priced home machine.

Tramiel: That's right. And because of the VIC 20, our business sales have

also more than tripled because of carryover.

So if somebody buys a VIC 20, for example, he then says, "Gee, this is a nice machine and I like it. Maybe I'd better go look at this SuperPET, or the CBM," or one of the new machines you have just come out with?

Tramiel: Correct.

At Personal Computing, we sometimes talk about people who are interested in computers as opposed to people who are really interested in computing. Is there any difference in the machine that those different types of people might buy?

Tramiel: Yes. The person who is interested in computing, most of the time, cannot afford to buy the computer he really wants. But he likes to get the

most for the money he has. We are the company that gives him the most for his money. This is our motto. This is what we do.

What about your SuperPET? Where do you see your market there?

Tramiel: The SuperPET is a product that is sold primarily to schools, not to individuals. The majority of individuals cannot afford, I'm repeating, \$2000 for a computer. But for schools, where more than one person can use it, the SuperPET is the best tool for education because it can learn all the high-language computing. So I say again, it's best for multiple users, but not individuals.

You seem to have a different perspective on the market than some of your competitors. Is that because you're an integrated company, so you can plan your product all the way from the beginning to the end? Does that give you some insights into what is coming in what we at Personal Computing call "the next generation of personal computers?" Can you talk about what kinds of things we are going to see?

Tramiel: You are definitely going to see more power for the money. You will definitely see faster machines like those with 16-bit microprocessors, and more. For the man who likes computing, that doesn't mean very much—whether it's 16-bit or 32-bit—because he needs more power for storage, and more speed. He doesn't care about 16-bit.

You're saying that 16-bit is irrelevant to that person?

Tramiel: That's correct.

But doesn't it give him the capability to do more things?

Tramiel: No. It is only faster.

But since it is so fast, doesn't it allow you to do things in software that you couldn't do before? Doesn't it, therefore, give you more capabilities?

Tramiel: We have an 8-bit machine at the present time which is faster than the 16-bit machines available today in personal computers. It all depends on how you design your machine. For the individual who likes computing,

"Now you take your kid when you buy your first computer—the ultimate role reversal."



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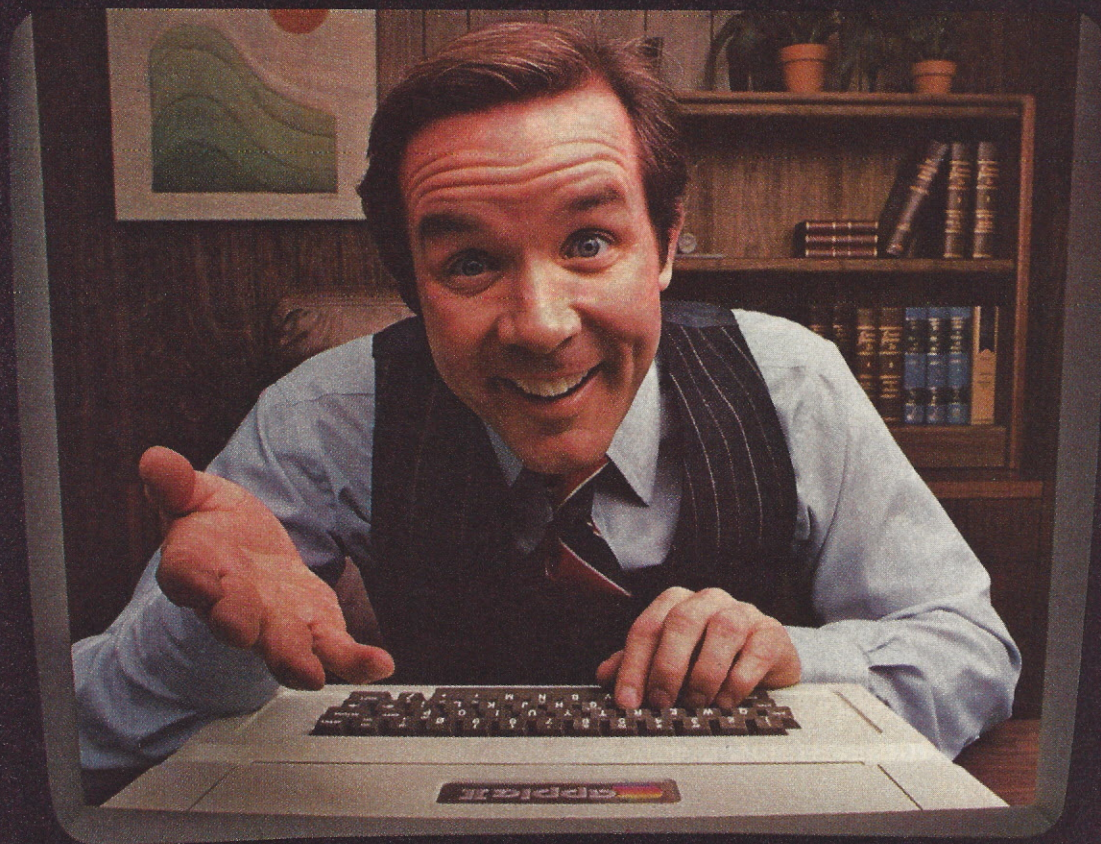
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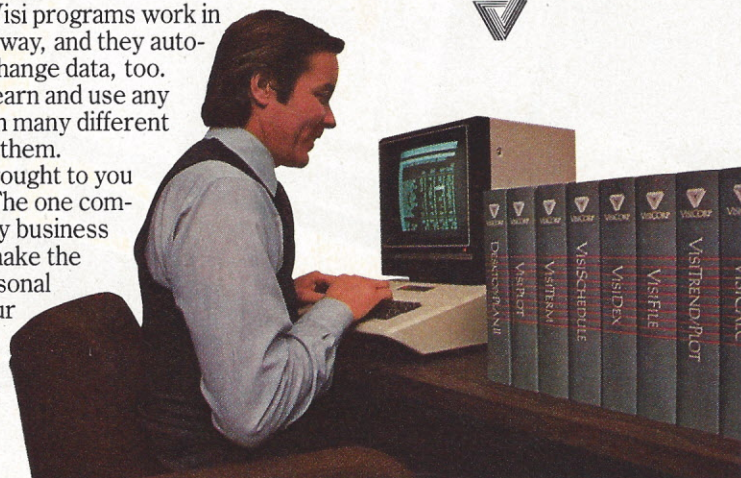
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speed is not the most important thing. **What is the most important thing?**

Tramiel: The most important thing is to be able to have a product to which he can attach any peripherals he wants, with as much memory as he can get for the money he can afford to pay, in a user-friendly machine.

The machines that are coming down the pike, are they going to be more "user friendly"? Is that a fallout of the new semiconductor technology? Like 64k RAM chips, for example?

Tramiel: As the ROMs and RAMs get bigger, there is more that we can put on them, more fixed information that we can give to the end user. That's our aim. But at the same time, there will soon be a third generation of computers which are going to be handheld portable computers. And this will be a boom to sales because people will begin to get used to using a computer in the future in the same way that they're used to handheld calculators today.

By that, you mean a computer that they can stick in their coat pockets and carry around with them?

Tramiel: That's right. In the 1990s a computer will be the same thing as a calculator today.

And you are talking about a general-purpose machine that you can enter data into and calculate with and do alphanumeric?

Tramiel: That is correct.

Will this computer also have the capability of plugging into mainframes, as you're talking about now?

Tramiel: You will be able to plug into a master at home.

Which you will have to do through some kind of a modem, I would guess, right?

Tramiel: There will be many different ways.

Can you venture a guess as to how long it will be before these kinds of capabilities are available in silicon? I'm speaking specifically now of low cost modems, like 1200-baud modems.

Tramiel: The 1200-baud modems are

available today at a cost of \$99. **Is that your new modem chip set?**

Tramiel: Yes. If we didn't announce it yet we will soon. That's a handheld calculator, with a modem built in.

With the modem built in, so it will be your own personal calculating and communicating device?

Tramiel: That's correct.

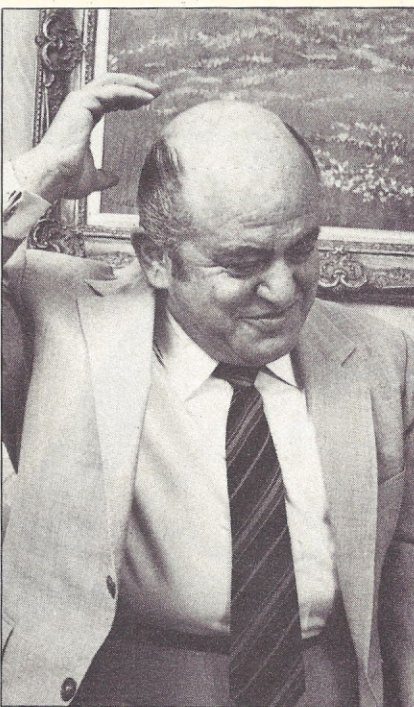
My goodness, what comes after that?

Tramiel: I'm not up to that just yet.

Let me put it another way then. If someone were to come to you today and say, "I want to buy a new computer," what would you recommend? I'm not talking brand name but generic. Would you tell him to buy an 8-bit computer?

Tramiel: I would tell them to buy a Commodore 64. Because it is the best

"It's different cars for different uses, for different needs, and it's the same with computers."



machine for the money. It has 64k of memory for \$595, and to match that in the next closest machine, you have to pay three times as much.

The Commodore 64 uses a 6502 processor?

Tramiel: No, a 6509. It is a color unit. It has very, very good color graphics. It has music. So what it gives you is a new 8-bit processor, like I mentioned before, that is twice as fast as the present IBM.

The IBM Personal Computer? But that's really an 8-bit machine, isn't it?

Tramiel: Yes, but as I said before: One, the Commodore 64 has 64k of memory. Two, it has good color graphics, so the man with a 64 can actually do good computing; he can do good color graphics, good games, the best in the industry. And three, with music he can have all kinds of entertainment with it, playing his own music or even writing his own music. So that, in my opinion, is the Rolls Royce of personal computers.

This is the computer that really tells you what else you can do with your personal computer? Play some music? Fine. What else? Do some graphics? Great. What you have described sounds, indeed, like a fabulous piece of hardware. But for some reason, Commodore, up to this point, hasn't seemed to catch on in the professional or business computing market. Why is that?

Tramiel: For the same reason we didn't catch on at first in the home market. We did not have the right machine for the United States. But the 64 can compete directly with the business computers from Apple and others of that type. Like I told you before, we know that to be successful, we have to offer a better product at a better price to the people who like computing. We understand them and, through our vertical integration, we can give them that. So maybe it takes us a little bit longer, but the end result is a product that we know the public needs and wants to buy. The 64 is that machine.

INTERVIEW

But doesn't it take more than just hardware to be successful? What about software?

Tramiel: That's right. And making money. We just had a Commodore PET show in London where we had 180 exhibitors showing products like software and peripherals. These were all small business people offering products for Commodore computers. So we are creating a whole new industry; we are showing young men how they can become rich writing software for computers. One is 14 years old.

Is this the same strategy that IBM is following with its personal computer—and Apple?

Tramiel: I don't know if they are or not. If they are, then I should charge them maybe for patent rights.

Whenever you introduce a new computer, all the software that you need for it seems to appear suddenly, as if by magic.

Tramiel: We make it a practice to work with the software houses, get the software done, long before the computer ever comes out. We work with them, because we know what this computer can do. We don't have to wait till somebody comes out with a chip, and then we put it into our machine, and then we go to the software houses.

So that's a real advantage, isn't it? Do you think that other companies will start doing this?

Tramiel: At the present time, to become a member of the "Silicon Club," I would say that you would have to put up a minimum, only to join the club, of \$50 million—and to be in business, at least \$150 million. So if anybody has that kind of money, I would say definitely, I would welcome them to join us.

What drives your product? How do you account for your success?

Tramiel: We are a technology-driven company. We tell marketing what we have designed. But at the same time, our engineering people understand the needs of marketing today. Our

engineers and marketing people meet at least once every three months, or once a month sometimes, to constantly update where they are. So we are a technology-driven company with inputs from marketing.

Getting back to the numbers you mentioned before—in 1985, what kind of share of that 50 million a year computer market do you expect that Commodore will have?

Tramiel: We believe we'll be happy with 10 percent.

That's 5 million, which is a five-fold growth from where you are right now?

Tramiel: Yes, that's very slow.

Yes, it is, isn't it? So how come?

Tramiel: You have to understand, I'm not saying that a \$5 million share is

all we hope to get. That is the minimum that we would like to do. Anybody who doesn't have at least 10 percent of the market shouldn't be in the business.

I wish you well, of course. But I wonder if perhaps you might not have an image problem. I've heard the story of a person who went out and researched computers and decided to buy a Commodore, and took it home and liked it. But then he went to a party and said, "I bought a personal computer." And the response was, "Oh, great! How do you like your Apple." Whereupon this person felt kind of intimidated about not being, forgive me, in the mainstream. Do you see that as a problem?

Tramiel: I don't think so, because I believe the public, and especially the computing public, is intelligent enough to know which product is better. And when they use it, they know what they have. They don't have to see it advertised on television or listen to what somebody else says. The day I change my mind on that and begin to believe that people are not intelligent, I will give up this business.

Apple, of course, has spent a tremendous amount of money for advertising; they have had tremendous success selling products. But the image which you attribute to Apple here in the U.S., we now have in Europe. We have spent the money there; now we are spending the money here; you are interviewing me right in my advertising agency's office, and we will be the same way.

So you don't see any image problem?

Tramiel: No, I don't. The man who tells you only about image doesn't understand anything about computers.

(At this point, an aide observed: "A Gucci belt does not hold up your pants any better than a piece of rope.")

Tramiel: Yes, but we are doing even better than that. We are selling you a Gucci belt for the price of a piece of rope. So we are giving you the best of both.

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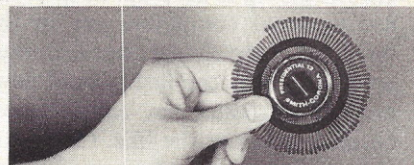
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What About The Rest Of The People?

While affluent schools pursue the goal of computing-literate students, who's caring for the less fortunate? Are we dooming a portion of American society to increasingly desperate poverty and economic hopelessness?

by David Gabel, Senior Editor

The statistics tell the tale. The economy is in trouble; more and more people are thrown out of work; Detroit is particularly hard hit. And all over in the older, heavily industrial regions, mills are closing and unemployment insurance is running out. A recent story on the front page of the *New York Times* said factory output declined for the 10th time in the last 11 months.

Yet personal-computer sales continue to climb.

There's no doubt that this society is undergoing incredible change right now. Technology is improving at an ever-accelerating pace, and people are struggling to keep up. People who use personal computers are in the forefront of the change, but even they are confused at the fast pace of new-product introductions, technological obsolescence and the like. Confusion abounds about the best product to buy, how to equip it, how to operate it, where to get it serviced. And this is true of the people who are on the leading edge of the technology.

Taking a back seat

People in Youngstown, Ohio, and Detroit and Saginaw, Mich., aren't confused about these problems. At this point, many of them just don't have the dollars to allow themselves the luxury of knowing that such problems exist. When the choice is buying shoes for the kids or gasoline for the

car so Dad can find a job, personal computing takes a back seat—way back.

As the technology accelerates, the people who are left behind—left out of the good times that are to come as the economy rebounds from its current difficulties—will be the ones who are completely unfamiliar with computing. People who are afraid of the machines—and many are, make no mistake about that—will be relegated increasingly to menial tasks in an economy that is rapidly running out of such tasks. People who, on the other hand, are familiar with computing will be the ones who get the better jobs—if there are jobs at all. They will be the ones who advance in their companies, move into the executive offices, and obtain all the benefits that come with success.

Those people—the ones who will enjoy success—are already starting to build their lead over the ones who will not. They're the people who are involved in *Personal Computing*. They're the people who are finding out how to get ahead as the pace of life advances, who are learning how to manage technology for their own gain and use that technology to their best advantage.

You already know, if you think about it, that an unemployed steel-mill worker, or a carpenter out of work because the housing industry is in one of its greatest slumps ever, or

an auto worker who no longer builds Oldsmobile 88s, isn't finding out how to use personal computing. He's falling further and further behind the power curve, and he doesn't even know it. Yet.

But he will. The changes wrought by personal computing will be far-reaching. As has happened in every other changeover of the economic order, there will be economic dislocations. And when that happens, some people will get very, very uncomfortable. And when people get uncomfortable, they do something to reduce their discomfort.

On the other side

Such discomfort led to the American Revolution, to the Civil War and to World War II as people moved to do something about their discomfort. It's been said that personal computing is causing a revolution now as people are using computing to make things better for themselves. But there is a possibility of a revolution on the other side of the economic railroad tracks.

Strict free marketers would say that the dislocations brought about by the increasing automation of the information society (a phenomenon of which personal computing is but one aspect) should be allowed to take place, and let the chips fall where they may. These people would argue that such dislocations are, after all,

“When the choice is between buying shoes for the kids or gas for the car so Dad can find a job, personal computing takes a back seat—way back.”

temporary, involving not more than a generation, at best, and thus of short duration in the move to a better society. Short duration is a relative term, of course. To those suffering the economic dislocations in the move to a better society, a sociologist's short duration could turn out to be a lifetime. Literally.

Perhaps. But the other way of looking at the problem is to realize that people will often attempt to find a way to ease the pain of economic dislocations. Indeed, to those who are in the most pain, it may appear that the entire problem can be solved, and very quickly at that. Just start a quick, violent revolution. Haven't we learned a better way to handle this possibility? Do we want Detroit to burn to the ground again?

At this point I should mention perhaps that I was in Detroit during the unpleasantness in the summer of 1967. It was an unhappy time for all—the residents, me and my fellow soldiers, the police and the city fathers. Avoidance of such situations in the future should be a high priority in this society.

Education: the better way

There must be another way. And there is. This issue is about it. It's education. It's imparting the knowledge of computing to the young when they can absorb it, before they get to the point where they're afraid to learn. It's making the fruits of today's technology available to people so they can get used to it and, in so doing, prepare for tomorrow's technology.

One of the old myths about Americans was this: People said they had the ability to fix anything mechanical given a few minutes to look at the offending piece of machinery, even with only a pair of pliers, some wire and a piece of chewing gum or two. That belief was probably based upon our experiences during World War II—when the fighting became mechanized, when soldiers who didn't

want to walk the tens of miles to the forward positions used their Yankee ingenuity to fix their offending tank, truck, jeep or what-have-you. That Yankee ingenuity couldn't have been bred into us if we hadn't had all manner of mechanical devices—chiefly automobiles—available for the kids of the late '30s, the soldiers of the '40s, to tinker with.

Today's Americans are the innovators in electronics and computers. There's no reason why Americans shouldn't have the ability to do almost anything with computers, office-automation equipment and the like. And indeed, where the machines are introduced in the schools, or in the after-school hangout where the video games beep and bloop to the delight of fascinated teens, this generation of Americans is proving as adept at mastering a new technology as any of the past generations have been. They all deserve the chance to get there.

What's the story?

That's why an initiative like the one that Apple is proposing—giving a computer to every school in the country, in return for a tax incentive—is so important. Of the total 84,226 public schools in this country, the number of schools that have any computers is estimated at 15,318, or only 18.2 percent. But that doesn't tell the whole story because in many of the schools the computers are in the administrative offices, well out of reach of the students. And, statistics suggest, the most computerized schools are clustered in high-technology, high-consciousness, high-income places like the New York metropolitan area, the Los Angeles basin, the San Francisco Bay area, Central Texas and similar places. Towns and cities like Somerset, Ohio, Detroit, Youngstown, Peoria, and Paducah, Ky., seem to have been shortchanged when it comes to getting computers into their schools.

Senator John Danforth (R,Mo.),

Senate sponsor of the so-called “Kids Can't Wait” bill, says that's precisely the reason for this proposal—to spread the wealth of computing literacy in the schools. As a Midwesterner and not, he quips, a Silicon Chip (the name given in Congress to legislators from high-tech manufacturing areas like Silicon Valley), Danforth wants especially to improve the computing lot of rural schools. “Whatever the limits on affordability of computers in the schools that have existed up until now,” Danforth says, “this bill will make those limits less obstructionist.”

Critics carp, of course. Some idealistic purists don't like the idea at all. They claim, perhaps with justification, that Apple proposed the idea for the mercenary purpose of getting a tax write-off and, perhaps, getting rid of some inventory. The argument is a bit too holier-than-thou, however. If the final purpose is accomplished—getting more computers to the kids so they can become with their computers like the earlier Americans with their cars—and that purpose is accomplished legally, great.

Some have said that the bill won't make any difference anyway because the limited time that children will have on the machines makes the amount they could learn so small as to be unimportant. But that's obviously not true. Remember the American with his chewing gum and pliers who could fix everything. ANYTHING we can do to help get people familiar with computing will pay off. “Our intention,” says Steve Jobs, Apple chairman and the originator of the idea of giving a computer to every school in the United States, “is to help motivate America to take an aggressive lead in technology and technology education.”

Right on, Steve. Keep it up. And if you get a tax break out of it, so much the better. How can we quarrel with a proposal that makes everyone a winner?

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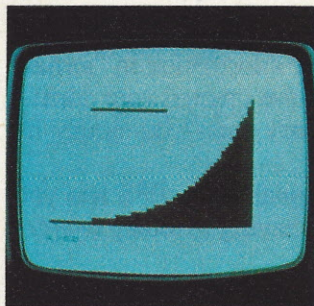
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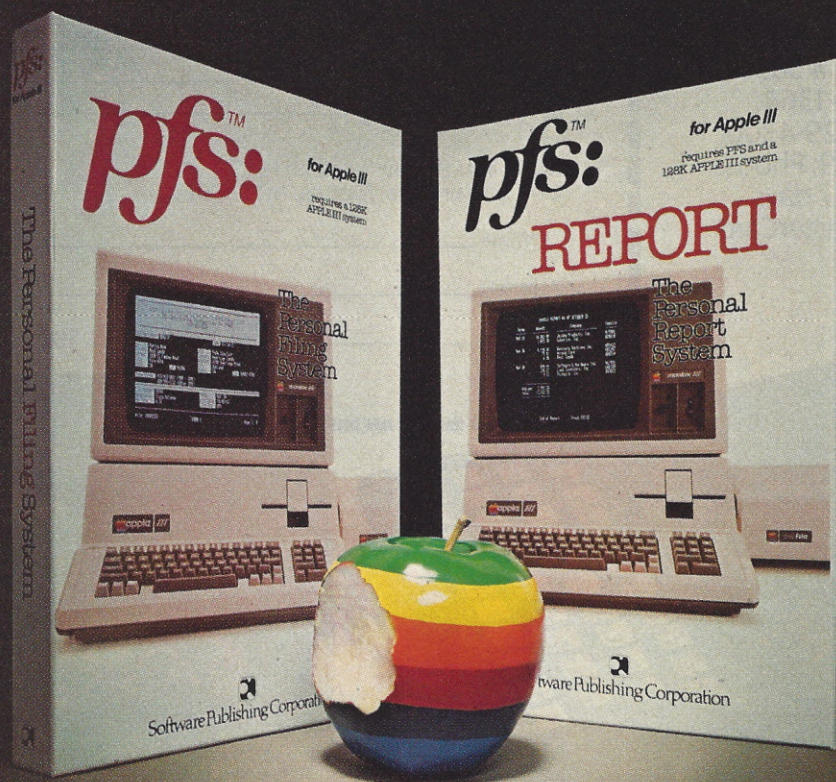
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Computing Literacy: Springboard To Success

On-the-rise executives, adept at computing, are parlaying their expertise into corporate success.

Computing literacy is getting them noticed in the boardrooms

by Jane Carroll

The grey-flannel suit was once the hallmark that many up-and-coming young middle managers used to impress the corporate powers that be. But not anymore. Now computer familiarity is fast becoming the new springboard into the boardroom as on-the-rise executives attempt to turn their technophilia into an advantage over their less computer-oriented colleagues. The ability to use a personal computer, these young executives reason, could be their ticket to success in the 1980s.

"I can see a breach opening in corporations between those who feel comfortable pursuing the new technology and those who don't," says Charles Hoerner, manager of office systems at Foremost-McKesson Inc., a San Francisco-based financial firm. "I see those who are afraid—who can't cope—who don't understand it—holding the technology off at arm's length. But it's becoming apparent to many that the most effective mid- and top-level managers are those who are not intimidated by the new technology."

One of these young corporate climbers is Casey Carhart, a 28-year old manager at Transamerica Corp.'s leasing division, who adds, somewhat brashly: "The older you are, the less

exposure you've had to computers. I grew up with computers. I can't remember not knowing how to program. Computers were like hot rods to me."

Carhart and Hoerner—and those like them—feel that they are in a good position to propel themselves into powerful posts in their respective companies; to them, computing knowledge gives them an edge over the competition. And while many other executives say that experience and wisdom are more impressive commodities in the corporate suite, very few will deny that computer expertise is becoming an irrepressible force in the business environment.

This isn't surprising, considering the impact personal computers are having on corporations.

The computer revolution

"Fifty-five percent of the 1.1 million personal computers sold in 1981 were bought for business purposes," says Bruce Hadburg, an analyst for Dataquest Inc., a research firm based in Cupertino, Calif.

So, coaxed by this apparently inevitable trend, many executives are suddenly anxious to get in on the computer revolution. The first step is often through education. Though personal computer courses for management are not plentiful, they are available.

Hoo-min Toong, an assistant professor of management science at the

Massachusetts Institute of Technology, teaches a one-week course for executives on the basics of personal computers, including everything from how to purchase one to how they work. The student gets hands-on experience with Apples and IBMs.

Toong says that the limited amount of computer education that his course provides hopefully helps the executives take the first step over the threshold of their computer phobia. From there, it's up to them to continue expanding their interest in the machines. "We're hoping that once people understand about computers," Toong says, "they can make their own way through the technology."

Another course, offered by the Stanford Alumni Association through its continuing education executive program, is a two-week class called Managing the Computer Potential. A similar course is also given by the American Management Association.

William Edwards, a partner in the venture capital firm of Bryan Edwards in Menlo Park, Calif., took the Stanford class last year. Edwards, 55, remembers seeing his first computer when he was in college. At that time, the computer that now fits on a chip took up several rooms in a Stanford basement. Back then, it made no difference to him whether he learned how to work that massive machine or not; today, his mind is changed.

Jane Carroll, a reporter at the San Francisco Examiner, frequently writes articles on business computing.

PROFESSIONAL/ MANAGERIAL

"Computers are such a vast and complex area," Edwards says. "All I used to have was these little pockets of knowledge. Now, I'm glad to say, I've moved from being abysmally ignorant to only moderately ignorant." He intends to put his new knowledge to work not only in considering companies in which to invest, but also to computerize his own firm.

Edwards took the Stanford course, he says, as a way of disassociating

And most look with envy at today's MBA students because they're now getting the education in computer technology that simply didn't exist 20 years ago. Yet some of these students, oddly enough, are refusing to take the required computer courses with open minds.

"Fifty percent of the entering MBA classes at Columbia are really enthusiastic about learning and are pleased to see how easy it is to learn,"

portant today may be obsolete tonight. "We try to keep up," D'Amato says, "like maniacs. I can't predict what will happen 10 years from now. Today we teach programming; maybe then we won't because there will be systems that generate programming codes. In 10 years, I'm sure we will be teaching how to interact more closely with the computer."

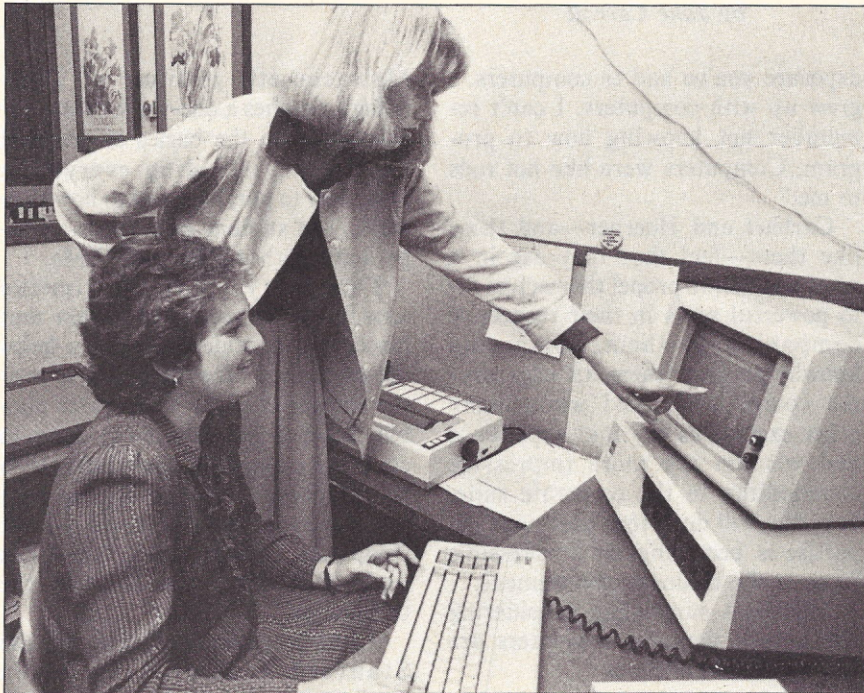
Others feel that within 10 years, working with personal computers will become so simplified—and the machines will be such a common part of home and business life—that courses will be extraneous and unnecessary. They feel that the more a "non-technical" executive embraces personal computers as a way of managing the mounds of information that cross his desk, the better the software and hardware will be to meet that need.

"The software has to be a lot more graceful before computers are widely accepted by all types of executives," says Bob Johansen, a senior researcher at the Institute for the Future in Menlo Park, Calif. "Right now it's written like hobbyists' software. It's not normal English."

Not business-as-usual

But even with the faults that current software continues to have, more and more executives, dissatisfied with business-as-usual at their firms, are turning to applications packages to ease their efficiency problems. Probably the most popular application is playing the what-if game, also known as the VisiCalc Solution: What if I changed that figure; how would that affect the company's cash flow for the next six months? What if the product was priced \$3 less; how long could I do that and still turn a profit? What if we leased that equipment instead of buying it; would that help us in taxes?

At Foremost-McKesson, with Hoerner's prodding, six executives have just been provided IBM personal computers. Garry Scholz, cor-



Lanette Frosted and Judith Raybin, two Foremost-McKesson executives, using personal computers for financial reporting. They are among a growing number of managers who feel that a familiarity with computers is one way to climb the corporate ladder.

himself from what he sees as a fear of new technology in his generation. "There's a great deal of tension and fear," he says, "on the part of businessmen who don't know about computers and who imagine that they are difficult to understand and prefer to sweep them under the rug. It's very widespread in my generation."

Minds closed to learning

Of course, there are many older managers honestly struggling with educating themselves about computers.

says Anthony D'Amato, director of computer services at Columbia University's business school. "Twenty-five to 30 percent find computer technology more difficult because they have a liberal arts background. And 25 percent are just resistant to learning about computers in general."

One of the problems with teaching or planning a graduate level course on computers for executives is the fact that the technology is changing so rapidly; what appears to be im-

“Computers are becoming the new springboard into the boardroom as executives turn their technophilia into a corporate advantage.”

porate treasurer, uses his for cash management, the management of tax benefit lease programs and projecting cash flow. He also has an IBM at home, which he has linked to his office computer. He checks interest rates and foreign currency transaction rates before he leaves home in the morning. Jon d'Alessio, assistant controller, uses VisiCalc to project interest expense and cash usage. Dave Malmberg uses his computer to analyze acquisition candidates.

While Foremost is approaching personal computing quite gingerly, other companies—such as Proctor & Gamble in Cincinnati, which has 400 personal computers scattered among its managers—are less demure. “The real personal computer upsurge at P&G has been in the last six months,” says Joseph Stevenot, director of the firm’s research and development services division. He and his staff use their personal computers primarily to assess new equipment applications in the company’s plants. “Before we’re through, they’re going to be used everywhere, at all levels of management,” he says.

Officials at Foremost, though, feel they have a good reason for accepting personal computers at a slower pace. While the firm has never produced a cost/benefit analysis on computerization, corporate higher-ups feel instinctively that benefits will not exceed costs until software improves dramatically.

“About eight years ago,” Hoerner notes, “the price of a fancy calculator dropped to \$200. People bought them, read the first five pages of the manual, chucked the manual into a desk drawer, and used the calculator a couple of times a month. We’ll have the same temptation if personal computers become status symbols. We have to guard against that.”

“The first people who will be using personal computers are managers in analysis positions, the ones who work with numbers all day in budgets, financial statements, and foreign cur-

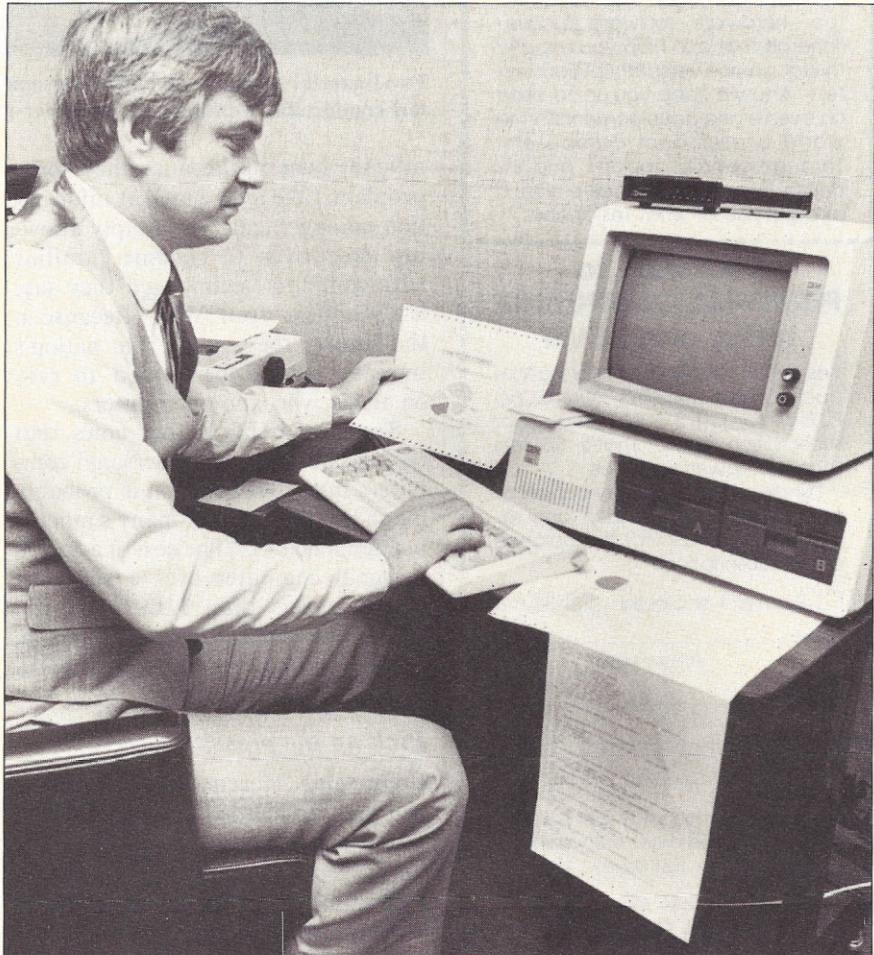
rency analysis. It will be such an important part of their work that it makes sense to spend a lot of time learning how to use the tool. But for most managers and executives, giving them a tool that requires so much training doesn’t make sense. Until you have the applications that are self-evident, they aren’t going to use it. They aren’t going to want to fool with something that gives them a lot of error messages.”

Simply more trouble?

Hoerner concedes, nevertheless, that the personal computer, used for the correct purposes, has already become indispensable at Foremost. “We

couldn’t do certain things we are now doing if all we had were a pencil and spreadsheet, even if we had a dozen clerks,” he says. “The value is in the ability to manipulate the information in the computer. We now create a spreadsheet and make up dates and plug in numbers and see what effect they have. It’s like the difference between the horse-and-buggy and the car. And I’m sure that sometimes people thought a car, with some of its problems, was more trouble than it was worth—at first.”

Others in the corporate world carry Foremost’s seat-of-the-pants cost benefit analysis even a step further. They feel that computers provide sig-



Charles Hoerner, a San Francisco office systems manager, says that the most effective executives are not intimidated by new technology.

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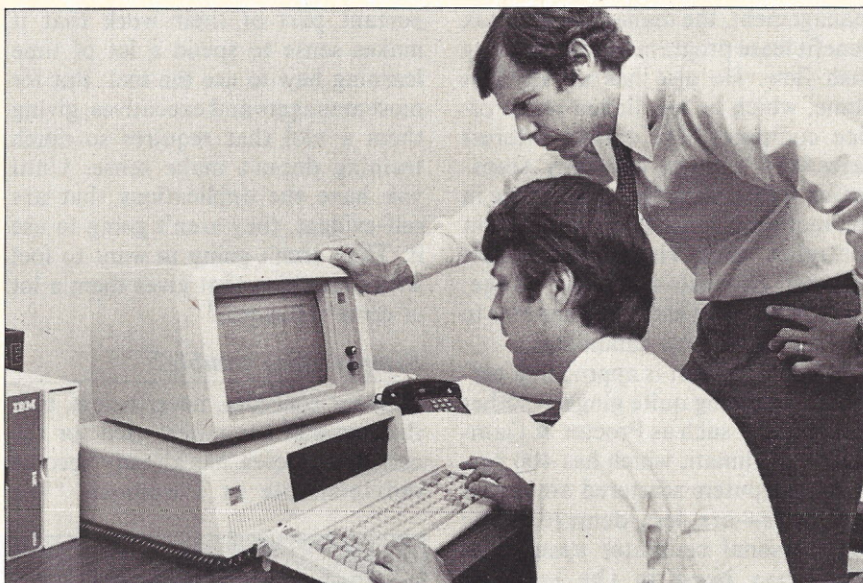
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PROFESSIONAL/ MANAGERIAL



Two financial analysts at the IBM Personal Computer. Like many young managers, they feel comfortable working with computer-processed information.

nificant benefits because they force people to take a new look at information management. But simply allowing executives to become familiar with computer technology, they say, is a benefit in itself. Why? Because in the future, they assert, the nation's businesses will be forced to rely on those who know computers.

Toong at MIT further notes that the cost of introducing personal computers into a corporation is probably much less than the company's monthly telephone bill. "The cost of a \$5000 personal computer over a five-year period is less than \$100 a month. That's not very expensive per person, especially when you consider what a manager's time is worth."

Pick up the pieces

Before long, Hoerner feels, Foremost will put the pieces together that will produce a positive cost/benefit ratio for personal computers. This system, he predicts, will be part of a massive communications network that will enable executives to work with text, numerical or graphic displays, manipulate that information, and send it

to other places worldwide. Hoerner also sees the technology spreading to unusual parts of the company—such as the delivery truck.

Clearly, executives who have accepted personal computers are convinced that the machines will soon become as natural a part of the nation's business fabric as the telephone. Personal computers, says Carhart of Transamerica Corp., will permeate our daily lives so subtly that they will even affect our manner of thinking. "Right now," he jokes, "my mind looks like a computer full of bugs." But he is serious when he says that, as executives becomes less afraid of computers, the entire face of business will shift into different types of planning, and, if the computer is used right, efficiency will be considerably upgraded.

Venture capitalist Edwards has no doubt that the personal computer will help him to be more productive. "It will help me leverage my time," he says. "I'll be more effective. I'll have the same advantage that a carpenter with good tools has over a carpenter without good tools."

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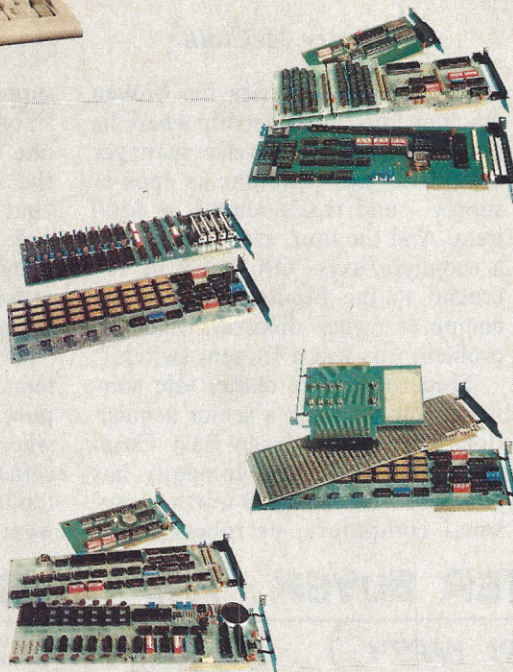
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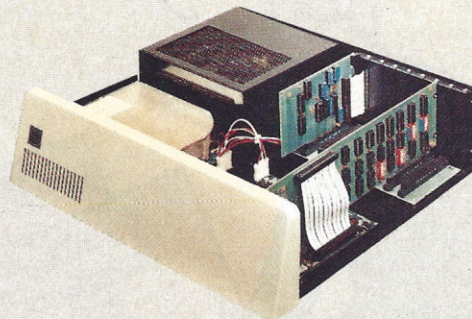
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CIRCLE 18

Servicing Your System: Be Prepared

Personal-computer owners are learning that the difference between a great system and one that's simply adequate could be a proper servicing agreement

by Larry McClain

Panic. Right down to your shoelaces. Just listen to Tony Cerreta. If you catch him in the right mood, he will regale you with horror stories about the night the last disk drive blew or the day the micro stood still—about personal-computing systems that were murdered by poor servicing.

"Yes, I've heard stories," Cerreta, a past president of the Big Apple Users Group (BAUG), says, "about

Larry McClain, a New York-based free-lance writer, is an avid personal-computer owner.

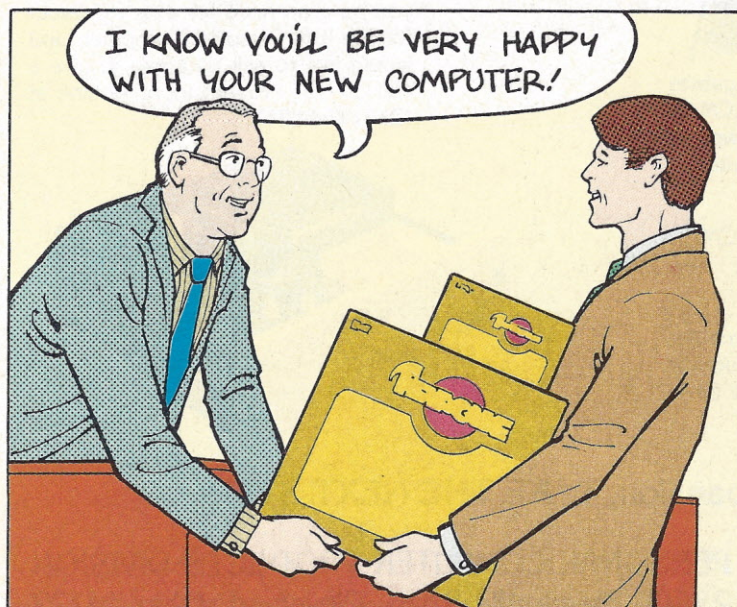
the person who carries his broken machine into the dealership where he bought it and the service manager diagnoses the problem as 'power supply'—and that's roughly a \$500 item. And the user, especially if he's a neophyte, says, 'OK, put it in. It's crucial to the business.' Later, the computer owner discovers that the problem was just a 15-cent switch."

Then there's the chiller tale starring Jerry Resnick, a senior acquisitions editor at a large East Coast publishing firm. His company has purchased over \$50,000 worth of personal computers, peripherals and

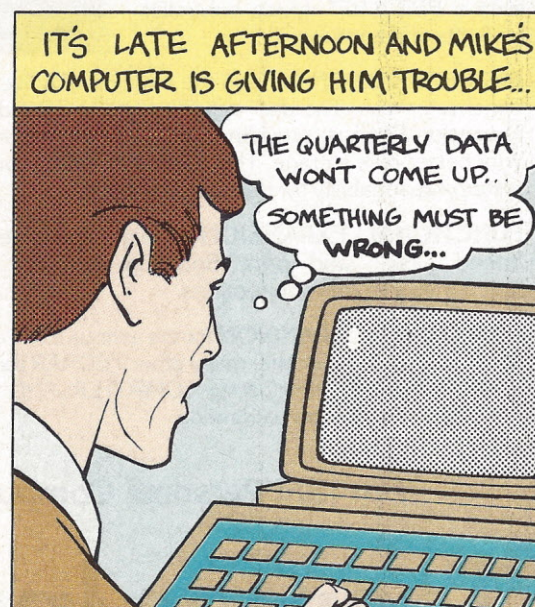
supplies from a single local retailer. "You'd think that a sizeable account like that would mean something to the store owner," Resnick moans, "but our company found out the hard way that some dealers want your money, not your service woes. Their attitude seems to be, 'Thanks for buying all this gear. Now, get lost.'"

While there weren't many problems in the first few months after purchase, Resnick's pique peaked when a disk drive blew and the dealer refused to provide a loaner. "And to top things off," Resnick fumes, "I went to the darned store myself to see

THE HAPPY COMPUTER BUYER ...AND THE SERVICE NIGHTMARE



FOUR MONTHS LATER



"Some users will regale you with horror stories about the day the micro stood still—about systems that were murdered by poor servicing."

how much a brand-new disk drive would cost. I mean, we needed this drive badly. And one of the salesmen—who was either ignorant or unscrupulous—tried to sell me a normal disk drive at a Winchester price. I was furious."

Even though these horror stories are true, our purpose in telling them is not to make you jittery or despondent. In personal computing, just like the cinema, the good guys have to be resourceful. While stakes and sunlight did the trick against Dracula, the personal-computer buyer must use his vocal chords to ensure timely, cost-effective service.

A service overview

If you remember nothing else from this article, commit the following to memory: You must talk to people—your vendor's regional service personnel, computer store service managers and users whose needs parallel your own—to get satisfactory service for your personal-computing system. If these individuals understand your unique computing needs, many service problems can be pre-empted.

Don't waste any time comparing

personal-computer warranties. All personal computers are created equal—at least for 90 days. With rare exceptions (such as Apple's one-year warranty period in Europe), the buyer has three months to consider his post-warranty options.

But before the angst of Day 91 sets in, let's examine the personal-computer service industry in general. For starters, it's a relatively new business. Radio Shack, one of the oldest firms in this field, began servicing personal computers in August 1977. And the infant industry initially looked to its papa—the mainframe/minicomputer service arena—for guidelines, but some of those "Thou Shalts" are now being modified and even discarded.

Most mainframe and mini-computer service agreements are renewable, one-year covenants, paid monthly, based on a percentage of the purchase price, usually 8 percent. For these upper-end systems, the availability of on-site service is a given: Nobody lugs an IBM 360 into the shop for repairs.

But you don't have to be as sharp a mathematician as Mr. Pascal to fig-

ure out that 8 percent of a \$4000 personal-computing system doesn't yield as much service revenue as 8 percent of a \$250,000 mainframe.

What percent of price?

Thus, many personal-computing service contracts ask for a higher percentage—18 to 20 percent of the purchase price—when they are based on a percentage at all; other agreements are simply annual flat-fee arrangements.

"People get accustomed to mini-computer service contracts at about 8 to 10 percent, but the personal-computer user can't expect a percentage that low," says Marvin Venable, vice president of marketing at Sorbus Service Inc., a servicing firm that has built a solid reputation among mainframe computer users and is now moving into the personal-computer arena. "Service contracts on most small printers, for instance, are already hovering around the 20 percent of purchase price level." Sorbus bases its personal-computer service agreements on an annual flat fee, a sum that the firm arrived at after extensive mean-time-

BY FREDRICK CANYON



BUSINESS

between-failure (MTBF) research.

Radio Shack, on the other hand, uses the percentage method to determine its annual service rates. "But you have to make any comparison of service contract costs on a dollar-for-dollar basis," says J.M. Fletcher, a sales manager at Radio Shack. "Our company's 12 percent in-shop service or 20 percent on-site service costs are quite often a much lower dollar figure than if the same percentages were applied to the purchase price of other vendors' equipment, which may cost more to begin with."

This percentage vs. flat-fee argument is just one of many indicators that the personal-computer service business is growing too fast to be

strapped with old rules that pertain to mainframe/minicomputer service agreements. The portability of personal computers, for example, gave rise to the so-called "carry-in" service contract, an option that can save users hundreds of dollars over the life of the system. And some companies are studying the feasibility of establishing nationwide networks of fast fix-it shops geared specifically to the personal computer and its peripherals. In short, there eventually may be a "Computer Midas" on your block, even though circuit boards are trickier to repair than mufflers.

If you're a newcomer to the world of personal computing, chances are you're either being too brave or too

cowardly about the hardware malfunctions that lie ahead. Dr. Stuart H. Barteles, a New York City psychiatrist, feels that it's easy to get suckered into the too brave school.

"The customer buys this equipment with the assumption that it's never going to break down," says Barteles. "But as your interest in personal computing grows, and as the system gets more complex, the more you need a good service contract."

Some down time

Barteles has experienced few hassles with his system (a 48k Apple II with a Z80 card, a Diablo 630 printer and two Apple disk drives), but he did have "a few hardware problems relating to the Microsoft card" and a short period of downtime due to disk drive failure.

So try to erase mentally what the friendly computer salesman told you about his merchandise being more reliable than a Maytag. Personal computers do break down, and the components with moving parts (printers, disk drives, etc.) generally require the most servicing.

"Disk drives are my biggest headache," says Jeff Erlich, applications technology manager at General Electric Corp. in Bridgeport, Conn. Erlich is in charge of an in-house group that advises GE executives on all matters relating to personal computing such as whether they need a computer, what brand they should buy, and what type of service contract makes sense for them. "I worry that perhaps some of the manufacturers are going after the cheapest disk drives they can get, and are putting them in their systems," he says. "And among users, there seems to be the prevailing belief that all 5 1/4-inch disk drives are the same; therefore, you buy the cheapest one you can. But I've been disappointed in the reliability of the drives from a lot of different vendors."

If that's not enough to jolt you out of the too brave mindset, consider



Sorbus, a major third-party servicing company, has a nationwide network of carry-in personal-computer repair centers. Sorbus also offers, however, a service contract that includes a computer pick-up and delivery option.

**“Firms are beginning to make moves
that will hurry the day when the
'corner computer fix-it shop'
will be common.”**

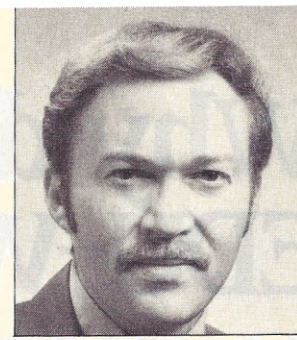
A Sample Of Servicing Options

COMPANY	IN-HOUSE SERVICE	DEALER/ DISTRIBUTOR	THIRD PARTY SERVICE	PRICE	TIME
Apple Computer, Inc. 10260 Bandy Dr. Cupertino, CA 95014 (408) 973-3019	No	Yes	RCA Data Services Cherry Hill, NJ	Apple II: \$225 Apple III: \$395 Winchester Hard Disk Drive: \$385	1 year, renewable
Burroughs Corp. Burroughs Pl. Detroit, MI 48232 (313) 972-7000	Yes	Yes	No	Varies with configuration	1 year
Commodore Business Machines 487 Devon Park Dr. Wayne, PA 19087 (215) 687-9750	No	Yes	No	Contract terms available at dealer	
Cromemco, Inc. 280 Bernardo Ave. Mountain View, CA 94040 (415) 964-7400	Yes	No	TRW Service Centers	Contract terms available at TRW	
Data General Corp. 4400 Computer Dr. Westboro, MA 01580 (617) 366-8911	Yes	No	No	Enterprise 1000: CPU: \$48 Printer: \$36 Enterprise 3000: Same as above with the exception of the Winchester Hard Disk Drive: \$45	monthly
Digital Microsystems, Inc. 1840 Embarcadero Oakland, CA 94606 (415) 532-3686	Yes	Yes	Data Tech Reliance New York, NY Washington, DC Chicago, IL	Contract terms available at dealer	
Digital Equipment Corp. 146 Main St. Maynard, MA 01754 (617) 897-5111	Yes	Yes	No	Contract terms available at dealer	
Heath Co. A subsidiary of Zenith Radio Corp. Benton Harbor, MI 49022 (616) 982-3200	Yes	No	No	Do not offer extended warranty	
Hewlett-Packard Co. PC Division 1010 NE Circle Blvd. Corvallis, OR 97330 (503) 757-2000	Yes	Yes	No	82905B Printer: \$60 return to HP \$120 on site can only be taken out in conjunction with a computer HP 85A: \$180 return to HP \$360 on sight HP 87A: \$120 return to HP \$240 on sight HP 86: \$84 return to HP \$156 on sight HP 125: \$156 return to HP \$288 on sight	1 year
IBM Information Systems P.O. Box 1328 Boca Raton, FL 33432 (305) 998-2000	Yes	Yes	No	System unit and keyboard: \$88 Monochrome Display: \$52.50 Matrix printer: \$141 5 1/4-inch diskette drive: \$49	9 months
Intelligent Systems Corp. 225 Technology Park Norcross, GA (404) 449-5961	No	No	R&M Associates Park Ridge, NJ Group 3 Electronics Santa Clara, CA	Warranty information available at service center	

BUSINESS

COMPANY	IN-HOUSE SERVICE	DEALER / DISTRIBUTOR	THIRD PARTY SERVICE	PRICE	TIME
NEC Home Electronics 1401 Estes Ave. Elk Grove Village, IL 60007 (312) 228-5900	Yes	Yes	Midtown Audio Repair and Service New York, NY Atlanta Technical Services Atlanta, GA	Do not offer an extended warranty	
NEC Information Systems 5 Militia Dr. Lexington, MA 02173 (617) 862-3120	No	Yes	No	Contract terms available at dealer	
North Star Computers 14440 Catalina St. San Leandro, CA 94577 (415) 357-8500	No	Yes	Mi/Sorbus	Advantage: \$86 \$344 Horizon: \$96 \$384 20% discount available on day of purchase	3 months 1 year
Olivetti Corp. 155 White Plains Rd. Tarrytown, NY 10591 (914) 631-8100	Yes	Yes	No	Prices on extended warranty and service contract vary according to zone and proximity to service center	9 month extended warranty and 12 month service contract
Osborne Computer Co. 26500 Corporate Ave. Hayward, CA 94545 (415) 887-8080	No	Yes	No	Warranty information available at dealer	
Radio Shack 1300 One Tandy Center Fort Worth, TX 76102 (817) 390-3272	Yes	Yes	No	Extended service information available at dealer	
Sharp Electronics 10 Sharp Plaza Paramus, NJ 07652 (201) 265-5600	Yes	Yes	No	No extended warranty offered	
Systems Group 1601 W. Orangewood Ave. Orange, CA 92668 (714) 633-4460	Yes	Yes	Yes	Service contracts vary according to the dealer and individual third party location	
Tarbell Electronics 950 Dovlen Pl. Suite B Carson, CA 90746 (213) 538-4251	Yes	No	No	Offer no extended warranty or service contract	
TEI, Inc. 5075 S. Loop E. Houston, TX 77033 (713) 738-2300	No	Yes	No	Offer no extended warranty or service contract	
Televideo Systems 1170 Morse Ave. Sunnyvale, CA 94086 (408) 745-7760	No	No	TRW Service Centers	TS 802: \$668 TS 802H: \$870	1 year
Toshiba Information Systems 2441 Michelle Dr. Tustin, CA 92680 (714) 730-5000	Yes	Yes	No	T200: \$50 T250: \$70	1 month
Vector Graphic 500 N. Ventu Park Rd. Thousand Oaks, CA 91320 (805) 499-5831	No	Yes	TRW Service Centers	TRW Contract: 1600 Model 1: \$492 1600 Model 2: \$540 2600: \$540	1 year

Jeff Erlich, manager of applications technology at General Electric, feels that many users, in order to hold down system costs, are purchasing bottom-of-the-line peripherals—and then complaining when they fail to work adequately.



these words from Sorbus' Venable: "It's been estimated that only 20 percent of the personal computers sold to date have printers attached to them. We haven't even begun to encounter some of the service problems that will arise when that percentage goes up."

The flipside of too brave, of course, is too cowardly. It's impossible to make sound business decisions if you cling to the craven, fatalistic notion that computers are the businessman's life-support system, and that service people function as intensive-care attendants who come around to hold the user's hand. An attitude like that can quickly escalate to computer hypochondria, and you'll be paying for service calls that could just as easily have been handled over the phone.

Daydream first

Before you scurry from vendor to dealer to third-party maintenance companies gathering mountains of servicing price quotes, kick your feet up on the coffee table and let your mind wander over your favorite subjects: you and your business or hobby. Think about your personal computer in terms of these subjects and draw a precise bead on your computer needs and circumstances. When your daydream is over, dealing with service choices—and how much that service should cost—will have become child's play. But to make the right choice, consider the following questions:

- Where do you live?

Geography is of paramount importance, yet some personal-computer purchasers never even give it a thought. Nearly every service organization tacks on a mileage surcharge for on-site service rendered outside a 50-mile radius. In many instances, you can't even get on-site service if you live more than 100 miles from a repair facility.

TRW and Sorbus are the two largest third-party maintenance organizations in the U.S., yet neither

has a service center in the state of Wyoming. Radio Shack's Fletcher admits that "while we do have field service in at least one location in each of the North Central states—North and South Dakota, Montana, Idaho, Wyoming—those states are the hardest for us to service." So residents of Laramie and Pocatello, be on guard. You will often be denied on-site service. And when the companies do deign to make "house calls," transportation surcharges can make the on-site option prohibitively expensive.

- How badly do you need your computer? Can you afford to let it be down for periods of 48 to 72 hours?

Most on-site service agreements define the business day as 10 a.m. to 6 p.m. Getting on-site service outside those hours is hardly worth the extra expense—which can be significant—unless you can't part with your computer during working hours. If you can let go of your machine for stretches of two or three days, an in-shop service plan might be your best alternative.

What, another breakdown?

On the other hand, if the system you purchased for "light" use winds up being the mainstay of your business, with printers thwacking and disk drives whirring eight hours each day, you'll need to make adjustments in the service agreement. The additional wear and tear often causes more breakdowns, and an on-site—even off-hours—contract might then be more attractive.

"Printers are the most likely pieces of equipment to go down when the user ups his duty cycle and starts using the system more than he had envisioned," says John T. Harnett, a business planning and development director at TRW Corp., a third-party service firm. "After all, they're electromechanical devices, and the increased usage causes the print quality to suffer. The platens and print wheels wear out faster."

- How much backup do you need?

Surprisingly, most post-warranty service contracts do not have provisions for backup hardware or loaners. In the case of both Apple and IBM personal computers, spare parts are so easy to come by that loaners aren't really necessary in most cases. Because of the modular nature of some components, particularly the CPU and expansion interface unit, the user can often get his equipment patched up while he waits. If backup is a crucial concern, however, try to get a clause added to your standard agreement.

- Do you wish to buy peripherals from many vendors?

Many companies utter a loud "No" when you ask them to service other vendors' peripherals that are attached to their computers. Says Radio Shack's Fletcher: "Before Radio Shack technicians work on any TRS-80, the other vendors' peripherals are detached. There have been some instances where the other vendors' equipment actually caused the TRS-80 to go down."

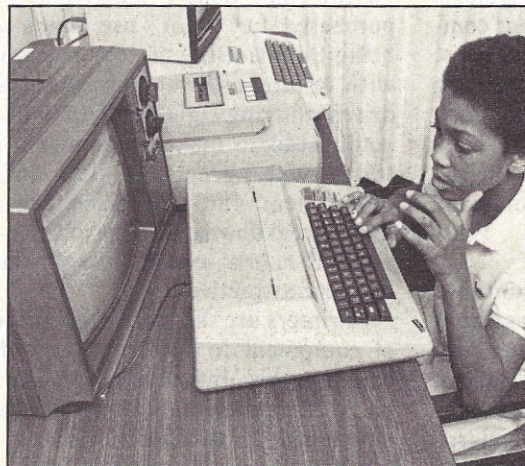
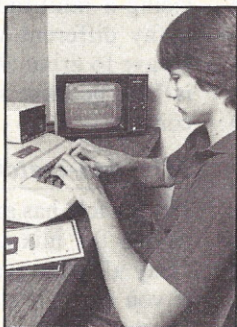
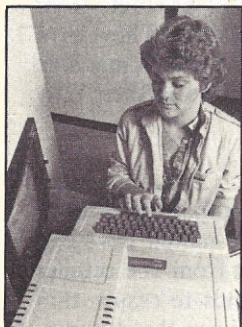
If you're still hell-bent on buying a computer from one vendor, disk drives from another, and a printer from yet another, the third-party maintenance organizations will suddenly seem mighty attractive. TRW and Sorbus are in the business of servicing a multitude of products from many different vendors. They have no axe to grind about which machine is best because service is their only concern.

Mix-and-match

Dr. Barteles has an important piece of advice for mix-and-match devotees: "Buy all your gear from one retailer if you can." It stands to reason that the dealer who sold you that peculiar assortment of American and Japanese hardware wants to retain your business, and will give prompt service. By the way, the Japanese vendors have also done a good job of

(continued on page 148)

Why does EDU-WARE bother to meet individual needs?



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Teachers participating in an MECC evaluation of COMPU-READ reported: "Students liked the programs . . . they really had to concentrate. It was surprising how even the youngest children stayed on task."* **COMPU-READ** is a tool for improving reading speed and recall because it works with the reader (child through adult), matching pace to performance.

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*From a review in the "Instructional Computing Newsletter"; MECC, May 1982.

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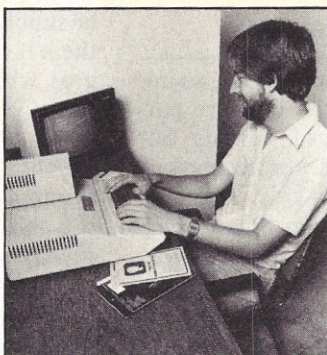
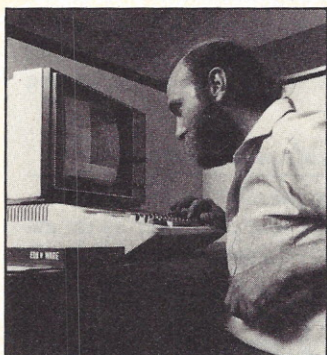
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EDUCATION

Squaring Off Over Computer Literacy

In classrooms, offices, homes, computer enthusiasts are engaged in quiet (usually) battle with computing enthusiasts over how we'll use the machines—while non-users get more and more confused

by Lee The, Associate Editor

Do we really need computer literacy? At least, as it's often construed, with the main focus on the computer's innards, on programming it, on treating it as an end in itself? The answer to that is a resounding no. What we do need, though—for ourselves, for our children, for our businesses—is **COMPUTING** literacy: the knowledge and ability to use computing systems as tools for the enrichment of our personal and professional lives.

Of course, there are computing professionals who do need computer literacy, and more power to them—they've given the rest of us a tremendous boost. But we must no more master their art than they must master their diverse skills and occupations.

Nevertheless, the fact that so many people confuse these two types of literacy has created far-reaching problems in schools, offices—even homes. Thinking you have to program computers merely to use them scares people off. In schools, it creates the same delusions as the New Math of a few years back that enveloped the straightforward, useful algorithms we call mathematics in shadowy webs of theory that even the teachers could hardly fathom....much less the kids. In offices, it perpetuates the myth that you must hire a programmer or become one to computerize your business. In homes, it sends many down a learning path that only diverts them from the applications soft-

ware that they must inevitably learn to use. And the manufacturers only help to confuse the issue. The average computer manual presumes you're either a programmer or about to become one.

There are solutions, though. And the first step toward finding them lies in learning to look for the false assumptions in most discussions of computer literacy. This is especially true at the beginning of projects affecting institutions like schools (or businesses) where an intelligent nudge can often get things rolling in the right direction. Since this direction benefits so many more than a programming emphasis does, it allows for developing a broader base of support, too.

Focusing on the school

Let's focus first on our schools, so important to those of us who are parents. The process of getting our schools to adapt to a new technology is important to our kids, first and foremost, but it also has broad implications that carry over into our work situations. Schools are indeed important sites for teaching computing literacy—though by no means the only ones—and in some danger of being bypassed if they don't soon pick up their pace.

Last month's *Personal Computing* included a school-focused article by David Grady ("A Hard Look at the World of Educational Computing").

In that article, Grady dealt with another controversy—whether our schools are suffering from a software shortage or a hardware shortage. He argued that schools have a hardware shortage on the grounds that kids can use applications software as we adults do, and they can program with no more software than a language like BASIC or LOGO. We agree that our schools could use more computers. But Grady ignored all the uses to which kids can put a single computer in small groups or even in whole classes. And he ignored, too, the dearth of good plans for what actually to do with computers—even in schools that have them in sufficient quantity. Training programs to implement those plans are in even shorter supply. But it will be easier to get them if we decide now to achieve a set goal, which is and must be computing literacy.

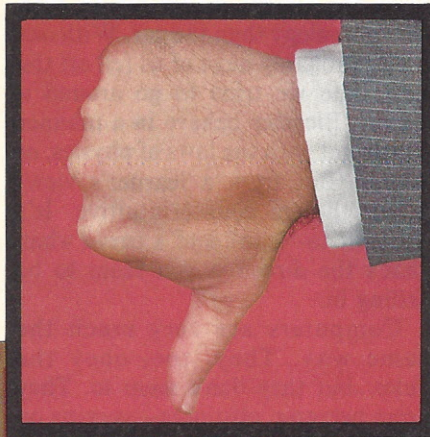
Comfortable with computers

Computing literacy should mean being able to use a computer as an everyday tool—to solve problems, to do the tasks it's best suited to do, those that help you the most. It should mean being comfortable with keyboards and other input devices (like joysticks, graphics tablets, voice command)—comfortable about dealing with the current strengths and limitations of computing systems—comfortable with how rapidly they're evolving.

Computing literacy can be defined as a combination of skills that allow you to drive down computing streets safely. W

"Schools are important sites for teaching computing literacy, but they are in danger of being bypassed."

Now, before we begin to count down the ways to teach computing literacy, let's first consider the three basic models of computing in schools. The first is the "one-to-one" model, in which every student has a computer. The second is the "one-to-many" model, in which a single computer is shared by a group of students. The third is the "one-to-few" model, in which a single computer is shared by a small group of students. Each model has its own strengths and weaknesses, and the choice of which model to use depends on a variety of factors, including the size of the school, the budget, and the needs of the students.



It should mean in that having the same sort of confusion and contrast that exist in the world of our car. And that no more means for my side is to get a computer that "automotive literacy" would mean being able to design roads and traffic systems. So what should the thought of "computer literacy" mean up to your mind? Should you see a class room full of computers?



At the darkest way to use a computer—the little more than a word—let's look at it in the light of the future. And the future can be learned with the help of the computer. At the darkest way to use a computer—the little more than a word—let's look at it in the light of the future. And the future can be learned with the help of the computer.

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EDUCATION

"Computing literacy can be defined as a combination of skills that allow you to drive down computing streets safely."

It should mean, in short, having the same sense of confidence and command that most of us feel toward our car. And that no more means being able to program a computer than "automotive literacy" would mean being able to design roads and traffic systems.

So what should the thought of "computer literacy" conjure up in your mind? Should you see a classroom full of young programmers teaching their machines to do computational backflips? That's the impression conveyed by the national news media. Their frequent TV and print specials on computers in schools almost always focus on the spectacular achievements of computing-gifted kids. We're continually shown a hothouse environment where young faces fairly gleam in the polychrome glow of a TV monitor, while their fingers fly across the keys, choreographing an electronic dance that will coalesce into a game, a graphic demonstration or something else remarkably bright and beautiful.

Somewhat less bright and beautiful, though, is the fact that so many purists now equate computer literacy with being able to program a computer. In taking that as a given, they may be doing more harm than good. A recent survey of shoppers at one computer store showed that a large percentage actually believed you had to program a computer to use it at all.

That used to be true—just as the ordinary driver once needed to be practically a crack mechanic to keep his car on the go. But as automobiles became more reliable, mechanics retreated from the front seat to the auto shop, where they remain to this day. And the same thing is happening now to programmers with the advent of new applications software (and hardware) that are easier to use and much more versatile than ever before.

Programming, if you can handle it, does give you something that's good to have—a sense of confidence and command that I referred to earlier.

Here the bicycle makes for an even better analogy than the car. With our bikes, probably most of us fell off the first time we tried to go around a corner. Bicycles behave in a manner consistent with the laws of physics, of course. But from a learner's viewpoint, they're counterintuitive. It's difficult to "lean" into a curve when that's the direction you seem to be falling in.

Computers are very much the same way. They, too, obey the rules...but they don't seem to. They seem perverse, obstinate—verging on ornery. That's because computers, even with the "friendliest" software, are still ruled entirely by logic. They rarely give you a break. Some new personal computing firms (like Excalibur of Albuquerque, N.M., or Symantec of Sunnyvale, Calif.) are working toward a mellower system, but it's still a pretty logical kind of mellowness.

You don't have to learn programming, though, to learn a computer's logic. And that's where the computer literacy enthusiasts clearly get confused. They think you do, and it seems reasonable.

Computing literacy may thus be defined as a combination of skills embodied in applications software that allow you to drive down computing "streets" safely and confidently. Most of your competence then will come from practical experience—using computers, seeing others use them, interacting with computers in group and solo settings. This competence has three main stages: (1) using them as machines, as a clerk doing data entry does; (2) using them as tools, as a manager doing financial analysis does; and (3) using them as creative instruments, as a writer or a programmer does.

Computers as machines

Dick Ainsworth is one of the software industry's genuine experts. He founded The Image Producers, an established Chicago software firm, and

now Kriya, a new firm as multi-dimensional as Ainsworth himself. He not only ascribes to this three-level model of computing, he feels it actually applies to all of our uses of technology. It generally starts, he says, with using your new machine to do something the way you used to—only faster. The use is repetitive, with the user seeming to become, in time, almost as machinelike as his machine.

Ainsworth believes that we will eventually be able to eliminate individual teachers in providing this level of literacy. The machine will teach you word processing, order processing, data processing, etc. The neat thing about this (for both kids and adults) is that as computers come to do more and more of the things discrete, single-purpose machines used to do, the user is transformed from operator to processor. "His skill," Ainsworth says, "will be to pick up new skills easily. And as long as he knows how machines with keyboards work, he can retrain himself."

Ainsworth further feels this level of computing literacy is tremendously useful. "The first survival skill for people going into the job market," he says, "is being able to operate keyboards and computers of all kinds...on processes." How many words a minute you can type will become secondary to how much you can use a computer as a powerful extension of your human abilities.

What schools call CAI (Computer Assisted Instruction) is at present the main way computers are used at level one there. CAI is denigrated by many as the dumbest way to use a computer—for little more than books-on-disk. In fact, a lot of it is dumb. And the quality can be lamentable. Milt McCauley, the principal of a small high school active in computing in Littlefork, Minn., reports that his instructors returned nine out of ten CAI programs they reviewed. But they kept the tenth, and are now satisfied with the drill and

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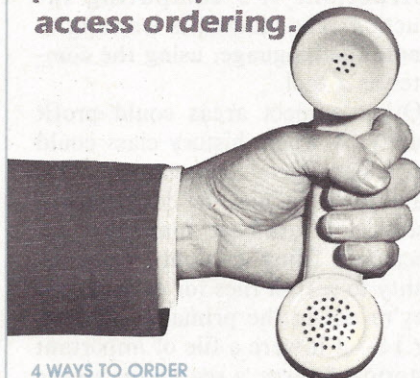
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“Computing literacy means being able to use a computer as an everyday tool—to do tasks that help you the most.”

practice programs they use.

Ainsworth's own firm has a CAI program available (Typing Tutor) that he claims entirely eliminates the need for a typing teacher. Users praise its high level of interactivity—its ability to diagnose just what errors you make typing, and then correct them.

Dr. Marley Watkins, head of Southwest Edpsych Services of Phoenix, suggests another virtue of CAI. It praises good performance, where many teachers don't.

Other critics question what's being taught. David Grady questions, for instance, the value of all the math drill the kids get. He says that students already come out of high school with pretty good computational skills—but a shocking inability to apply them to real-world problems.

Regardless of how effective CAI is, though, in teaching a specific subject, its users are learning computing skills that could turn out to be even more important in the long run. Computer literacy purists assert that in CAI the computer runs you. This just isn't true. The student comes in, turns the machine on, and does the work he wants to do on it—or that which the teacher wants him to do. With teachers like Mike Clay of Littlefork High, at least, the student is being taught how to teach himself. If you had to name just one skill—just one—that you'd like your own kid to leave school with, wouldn't that be it?

Computers as tools

When you move to this level, using the computer as a tool, you begin to use the computer to enhance the way you make your living, not how you make your living. “The tools are used for enhancement and empowerment,” says Ainsworth. A businessman accomplishes this, for example, through Ainsworth's Time Manager program, or a spreadsheet calculator. These are targeted to be used by today's executive—not his clerk. And teachers at this level will not be

replaced, he feels. Yet in schools, this critical level often seems to drop into a crack between CAI instruction (often for slow students) and programming instruction (usually for the gifted). Which is strange, since most adult professionals can anticipate using computers primarily at the tool level.

This is also one area where software is demonstrably plentiful. All a good teacher has to do is work lesson plans around adult word-processor software, data-base managers, spreadsheets, telecommunications software, graphics software, etc. While a keyboarding class could use word-processing software at level one, an English class could use the same software as a tool in English composition—and not just one-on-one, either. Classroom demonstrations using a 24-inch TV monitor could help a whole class learn editing—a skill that remains virtually untaught in public school classes. A few minutes per student, shoveling text around, could give a student the launch he needs to become a crack editor.

And mind you, this is not computer instruction. It's computing instruction. The student is learning to handle the language, using the computer as a tool.

Other subject areas could profit equally. A whole history class could use a data-base management program to learn how to do historical research. (Data-base managers are electronic filing cabinets with the ability to search files for data even if they're not in the primary filing order.) So if it were a file of important historical figures, a search for all the ones who were warriors would create a cross-file. A further search for the warriors who established lasting kingdoms could show students how to refine their organizational models to get at significant data, instead of just accruing facts.

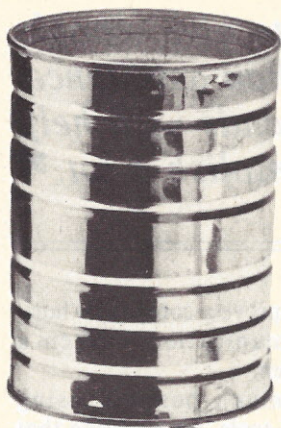
A lot is happening to students here. They learn the subject matter (an-

other critical professional skill) and become computing literate—all at once. The ability of the data-base system to do cross-correlations beyond the filing systems of many libraries is especially useful. Also critical is a new way of looking at data—to realize that raw data is just indistinguishable lumps until it's used dynamically, until it's manipulated, until it's applied toward some end. In this way, students can advance beyond taking in data and simply spewing it back on command.

In addition to regular adult business software, strong simulations and demonstrations are now being developed. One of the biggest problems in teaching math is getting students to realize that math can be a language describing how things move and interact physically. A good simulation can show this better than a book and more interactively than a movie.

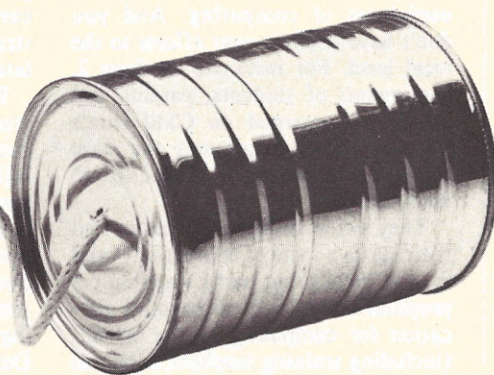
Computers-as-tools is rife with enrichment possibilities, too. A student who finished his work early in driver-ed class could do supplemental work on a flight simulation program. And this would give students incentive to do their work in an effective and timely manner—yet another critical professional skill.

Now is there anything beyond this level that qualifies as computing literacy? Yes, although much of it would have to be classified as proficiency rather than literacy. Our children would be well-served if schools focused on the first two levels. Other institutions would, too. You can probably think of a variety of industrial and professional training situations in which the kind of group work described here would benefit people in your firm. Training a sales force to use data-base managers in their follow-up work alone would be quite a boon. Or teaching mid-level managers how to use word-processing software and upgrading their secretaries using the same word-processing programs. And training these managers in a group context



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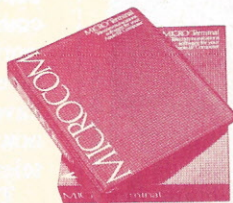
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"Parents tend to give schools demands rather than assistance. Match your demands with help and you'll accomplish a lot."

HOW KIDS TAUGHT THEIR LEGISLATORS

If you learn computing best by hands-on experience, it stands to reason others would, too, such as officials you want to convince about the usefulness of computing. And you don't have to limit your efforts to the local level. For instance, on June 2, contingents of students, parents and teachers converged on California's state capitol from all over the state for a "Computers in Education" demonstration.

They came to give legislators and their staffs a taste of computing—and to urge them to support a state budget proposal including a substantial allocation for computing in the schools (including training teachers, a crucial factor). The California Commission on Industrial Innovation, associated with the governor's office, organized the event, aided by Computer Using Educators, a statewide organization headquartered in Cupertino, and local parents, teachers, students and school districts.

The students and their computing systems—provided by Apple, Atari, Commodore, Radio Shack, Corvus

and Control Data—occupied two large rooms near the legislative chambers. Over 800 state legislators, department heads, state employees and curious passersby visited the demonstration. And since the allocation was later approved—perhaps it helped.

Each "tourist" was greeted by a student "tour guide" or one of the accompanying parents or teachers, and invited to try his hands on a computer keyboard. They showed the legislators how to use examples of commercially produced educational software, public domain materials and student-produced programs, along with learning systems from Corvus and Control Data.

Over 60 youngsters from 16 school districts throughout California participated.

What can you, as a parent, do about putting on a similar demonstration in your state? A lot. You could start by sending a copy of this article to your own legislator and asking him about it. And think about what your own child would get from being in on such a project!

could well improve a company's horizontal communications—often a serious problem.

With so much possible using computers-as-tools, it's a shame that so much more effort is directed toward the next level. People arguing for computer literacy forget that what's most exciting about computers isn't the machines themselves, but what we can do with them. They argue that programming is the most powerful (they love that word) thing we can do with computers. But those who lack the time and inclination to change professions, will find they get more bang for a buck, so to speak, by putting a month into mastering a collection of good professional software rather than putting the corresponding time into programming. They couldn't learn enough in that time to create any worthwhile programs. And even if they could—why reinvent the wheel? However, there's more to the next level than programming.

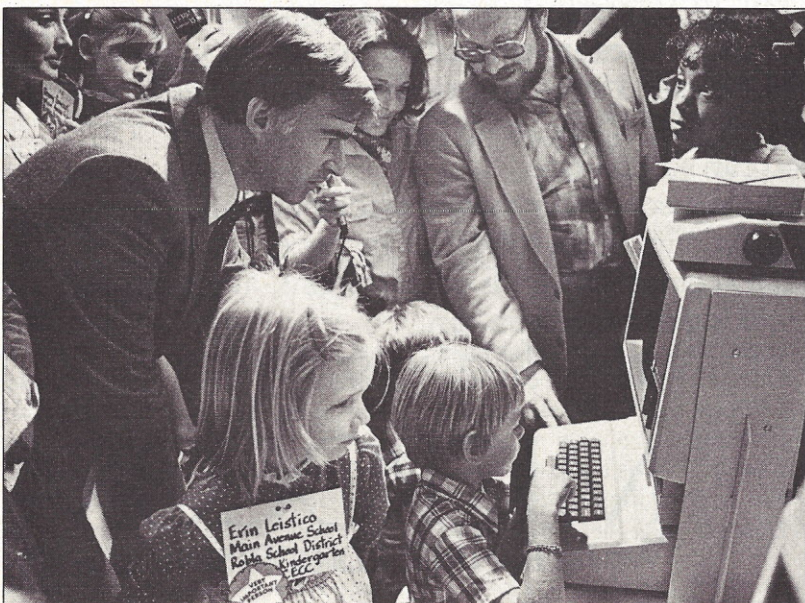
The user makes the difference

The word processor—that's used to teach word processing at the first level and composition at the second—here at the third level can become the creative writer's wings. Computing is not primarily hardware-defined, or even software-defined. It's user-defined.

Ainsworth thinks a musician could choose the computer as a valid alternative to an instrument such as the flute; a composer could use it as an alternative to working with a jazz band or a string quartet; an artist could use it as an alternative to working in acrylics or bronze sculpture. And all these skills, he says, have commercial applications even now—in advertising, in the movies, in television.

This is also an area where practitioners are creating new industries, new art forms. As Ainsworth says,

(continued on page 69)



California Governor Edmund G. Brown Jr. watches as 6-year-old Peter Behler demonstrates his computing literacy during an exhibition at the State Capitol.

photo by Bob Moore



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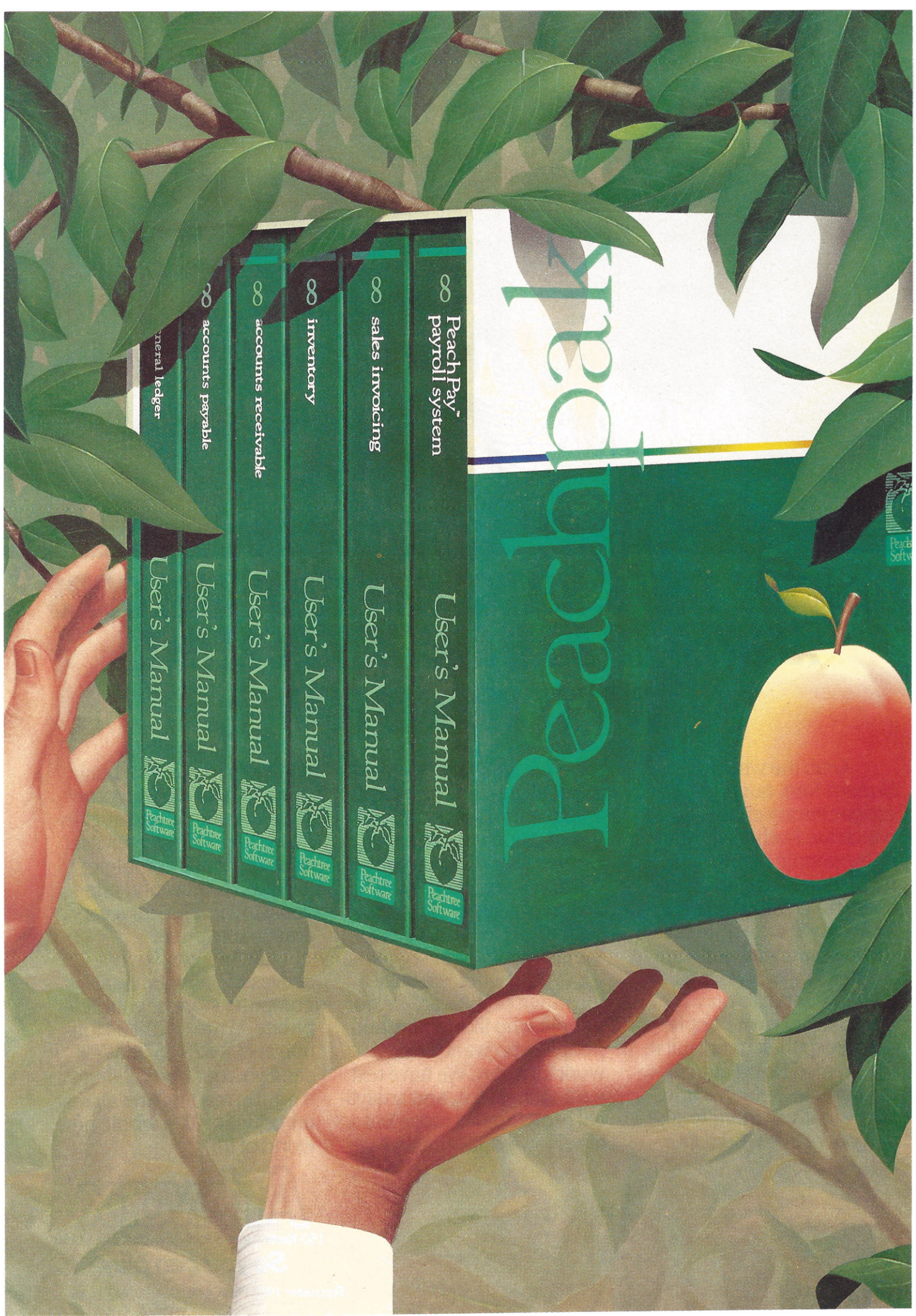
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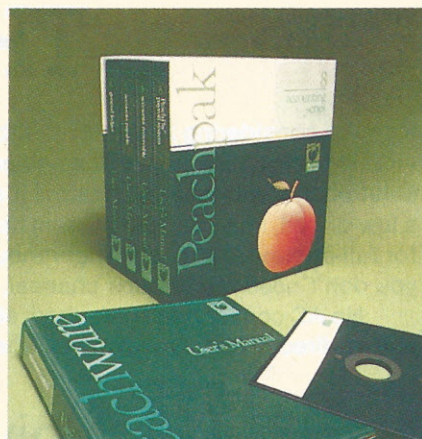
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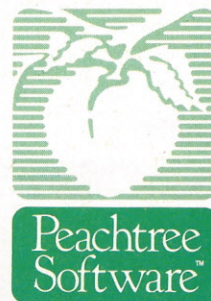
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EDUCATION

"Computing should not be primarily hardware-defined or software-defined, it should be user-defined."

COMPUTER LITERACY

(continued from page 64)

"parents want kids to take liberal arts classes to give them an appreciation of the arts." Working with computers, they can get that appreciation of the arts at level two, courtesy of our tax dollars. School clubs and home computers are also good ways to extend that interest to level three. This is especially true when it comes to programming, which can be done with computers much too low-powered to be effective at level one or two. Thus, a school computing club could run a fund-raising drive to get the money it needs for a number of computer kits, assemble them and go at it. It's not the public school's role to do this in the classroom, but private industry could well fund programming introduction in local schools (given how desperate computing firms are for programmers, that might be a very sound investment). And having company staffers teach the classes could also be a valid recruiting device that might well pay for the staffer's time.

There is another argument for not incorporating programming into regular school instruction, and that's the fact that whatever programming you teach a kid may be obsolete by the time he reaches the job market. The entire personal computing industry is driving very, very hard towards making the machines easier to use—the makers know their ability to address a really broad marketplace depends on it. So you might end up in the same position as a person who taught blacksmithing in 1890.

Yet the other levels of usage will remain. Artificial intelligence is too far from actuality to make computers work like us in the foreseeable future. They may become mellower machines, but machines they'll remain. So we'll have to learn to deal with the "mentality" of this slave to take advantage of its appetite for hard work. And while voice and other non-keyboard input will expand a lot in

the next few years, the keyboard will probably remain the dominant way of interacting with a computer. Applications programs will get easier—but there will still be things like word processing, time management, etc. to deal with. Programming as we know it, though, could get buried by ever-more-versatile programs that will let you achieve the results of today's programming while only expending the effort needed to use today's applications software.

People also argue that you can use programming to teach logic. That's perhaps true. But why not just teach logic? If anything, the logic of the computer is too limited to give a good model for determining human actions. However, a good CAI logic program could supplement a logic class very nicely.

The idea of teaching classes about computers in some ways smacks of treating them as exotica. They're not. Kids don't see them that way; they see them as programmable arcade game machines—in many cases, that having been their introduction to computers, a quarter at a time.

The computer needs to take its place in instructional contexts as simply the device you expect to have there, as inevitable as a blackboard. That is not to say you should never have a class about computers—but if you stop there, you haven't given your students a fair shot at living in the 21st century.

So computing literacy can be acquired from using computers as machines, as tools, as creative instruments. And given how limited school resources are—and how misleading a heavy focus on programming can be—it makes sense to see our efforts (and tax dollars) devoted to getting our kids through the first two levels. Really, the same thing goes for most businesses, given the recession and the realities of the free enterprise system. And it goes for you as an individual. Feel free to pursue programming either as an avocation or

as a vocation. Indeed, there are many businesspeople who learn enough programming to modify and adapt applications software to their own particular needs. But not only is this chancy (it invalidates warranties)—current software is making it largely unnecessary for personal computing.

But given computing literacy as the goal, how do we get there?

Where you come in

Computing literacy spreads out from the leadership of computing-literate people. "Follow me" works far better than "you go there." And even if you're already literate, you'll lose your lead if you stand still. You know how fast computing is evolving. So the ways beginners become literate closely resemble the ways literates stay literate. Here we're not just describing a way of getting started—but a way of constant self-development. Just as weight control comes from eating habits, not diets, so computing literacy comes from certain lifelong attitudes and habits, not from taking a crash course and being done with it.

Your personal computing literacy will come from a pattern of practical experiences interacting with an ever-deepening grasp of your goals.

Literacy, indeed, comes from practice, practice, practice! And practical experience is at least 80 percent of it. Computing resembles playing the piano or speaking a foreign language. Knowing theory is useless without doing it. Doing it is your foundation. You could, through long practice on applications programs, become strikingly good with computers—without knowing any theory—just as an experienced speaker of some language may use it flawlessly without being able to explain its grammar. The converse is not true. So if you have time for only one computing-related activity, make it using the system.

People who try to start with theory—at least with computing—tend to learn more slowly and wind

EDUCATION

"Computing resembles playing the piano. Knowing theory is useless without doing it. Doing it is your foundation."

up full of misconceptions they have to unlearn. That's because they aren't getting the constant corrective feedback of trying out what they think works—and seeing how it really does.

Quicker by hand

The trouble is that for a while it will be far easier to do things manually. Or delegate them to your secretary (and then she'll become computing literate instead of you). At the beginning, every mistake seems to slam you into a blank wall. And you have to retrace your steps to see where you deviated from the narrow operational envelope of your system.

But most new competencies come only through effort, through making countless mistakes and experiencing the consequences. Painless learning is the myth promulgated by mail-order schools advertising on matchbook covers. Even the fairly casual long-distance runner—or the far less casual arthritis sufferer—knows that his goals lie on the other side of a wall of pain. And he has the intelligence and the guts to know the rewards are worth the effort.

A beginning touch typist will be able to write far faster with a pen (up to about 35 words per minute). And a good typist starting in with word processing may feel he dropped into a slow-motion nightmare. A normal program will have five or six dozen main commands to learn, along with a new style of writing.

But think of the way a gull must feel the first time he tries to take off, running and hopping along the ground, panting, flapping. He, too, must feel he's never going to make it and who needs to fly anyway?

You need to extend your use of the software you already know, to keep adding new software programs to the ones you've mastered and to keep abreast of hardware developments.

You can invest a few hours a month in computer store visits and get to know your dealer. A smart dealer who feels he has your patron-

age will help keep you informed. Go to local computer shows like the West Coast Computer Faire, Applefest and small-business-oriented shows. These aren't all that frequent in any one area, and more and more they're being frequented by professionals like yourself.

Each thing listed here—hands-on experience, store and show visits, keeping abreast of hardware and software developments—will help you to become more computing literate. There's one other factor that will help you tie all these together. That is the attitude of consciously adding to your mental framework of computing literacy each thing you do or experience. You don't have to do this. Most don't. But it will elevate you from the merely competent to someone with vision.

In practical terms, if you're mastering a word-processing program, keep in mind the standard of computing literacy proposed here, and keep fitting what you're learning into that framework. That can be hard. You can get trapped in the immediacy of learning and the knotty problems that inevitably crop up. But you'll reach computing literacy fastest, paradoxically, if you take enough time with each step to fit it into your long-range goals, rather than getting hasty-minded about it all. One truth about automating business processes is that the benefit comes from computerizing a whole system, even though one aspect or another, viewed separately, would go faster manually. For an accurate typist, text entry isn't much different on a computer or a typewriter. But when it comes time to edit, you're in different universes.

Thoughtful men and women of action are rare in this age. All the more advantage to the few who can pull it off. They tend to be natural leaders. And individualists. Hence, the first people you should help towards computing literacy after yourself would be your family and those who work for you.

What we have espoused for you, you can espouse for those you care about. They will profit from both your personal example and your help.

Demonstrations work very well—for teachers, the PTA, the school board. In California, school children from all over the state recently gave lessons to legislators at Sacramento (see page 64). Just as there's no substitute for practice in your becoming literate, there's no substitute for putting those you want to convince in front of a computer with someone (preferably your kid) to show them the ropes.

Gather some allies

A demonstration for teachers will also attract the ones who'll become your allies (and to whom you can delegate much of the work needed, along with interested students). Often, you just need to get things rolling.

And if the school's computers are being hogged by technocrats, you can demand that the school make computing literacy available for everybody. The programmers can form a club and buy inexpensive computers (like Sinclairs), instead of squandering your tax dollars.

Parents tend to give their schools demands rather than assistance (except where football and band are concerned). Yet it's unfair to ask them to build a house, so to speak, without giving them the tools and materials they need. Match your demands with help and you'll find yourself accomplishing a lot.

Kids can learn a lot about both computing and cooperation working in groups, or even as whole classes. The more computers, the better, but don't let tight budgets discourage you. And often if you can get just one in, and get it used right, more will show up. Just watch. Better to have one used right than dozens in closets. So make sure the school's plans include training and software—not just a hardware purchase.

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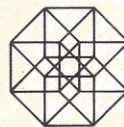
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“Learn to deal with the mentality of this ‘slave’—the personal computer—to take advantage of its appetite for hard work.”

And there's no reason why computing for you and your employees couldn't be taught on the same systems in night school. One of that handful of computing-literate teachers could turn out to be a very good instructor for your own needs, too, as could your own child (which might do wonders for his or her self-image and relationship with you, too).

If you're already computing literate yourself, you could work on a software/hardware selection committee. Schools often buy a computer system too weak to do much more than write minimal programs or play games. You can keep that from happening. And your knowledge of applications software for business could help teachers make better use of computers-as-tools computing. Such a committee might even wind up doing useful research on products your own business could use. What you know about the practicalities could combine with what the teachers know about educational validity to make a superb evaluation team.

Making government work

You can help the schools tremendously by writing to your legislators. Ask them what bills are pending to help kids become computing literate, and what they're doing about it. Legislators report letters like these are taken very seriously—far out of proportion to their numbers.

The most important bill in the works now is the Kids Can't Wait bill inspired by Apple chairman Steve Jobs. It's sponsored by Representative Pete Stark (D-Calif.) as HR 5573 in the House, and in the Senate as S 2281 by Senator John Danforth (R-Mo.). According to Jobs, “the basic concept is that each public school in the United States should have a computer to help develop technology education and training. Apple has decided to take the initiative in reaching this goal by offering to provide free computers to many schools in the United States. The costs of such a

program are manageable if we receive some assistance from the government.”

There is a present law giving tax breaks to firms donating scientific/technical equipment to schools. This new law just extends it to donating computing-related equipment to elementary and secondary schools. “Both public and private schools would be eligible donees,” Jobs notes. “The donee must be the original user and the equipment must be not more than two years old. Contributions would qualify only if made within one year after the date of enactment of the law.”

The same thing can be done on the state level. In California, Chuck Imbrecht (D-San Benito County) and Dominic Cortese (R-Ventura County) have sponsored AB 394, which parallels the federal bill—mainly to give California the benefits of Kids Can't Wait in case it fails to make it past Congress. You can help get similar bills enacted in your state by writing your local legislators.

Firms like Apple stand to gain a great deal if kids' first computing experiences comes through their products, of course. But higher motives are involved, too. As Jobs says, “Our intention is to help motivate America to take an aggressive lead in technology and technology education.”

You don't have to quit

If computing literacy has daunted you so far, fear not. You can attain computing literacy without having to change your profession to Computer Specialist. That goes for everyone else you care about, professionally and personally. And by keeping three levels of literacy in mind (machines, tools, creative instruments), you can create a framework for the expansion of your abilities into this realm—an overall perspective as useful to computing literacy as a business plan is to running an organization.


But you can't rely on anyone else doing it for you. The computing in-

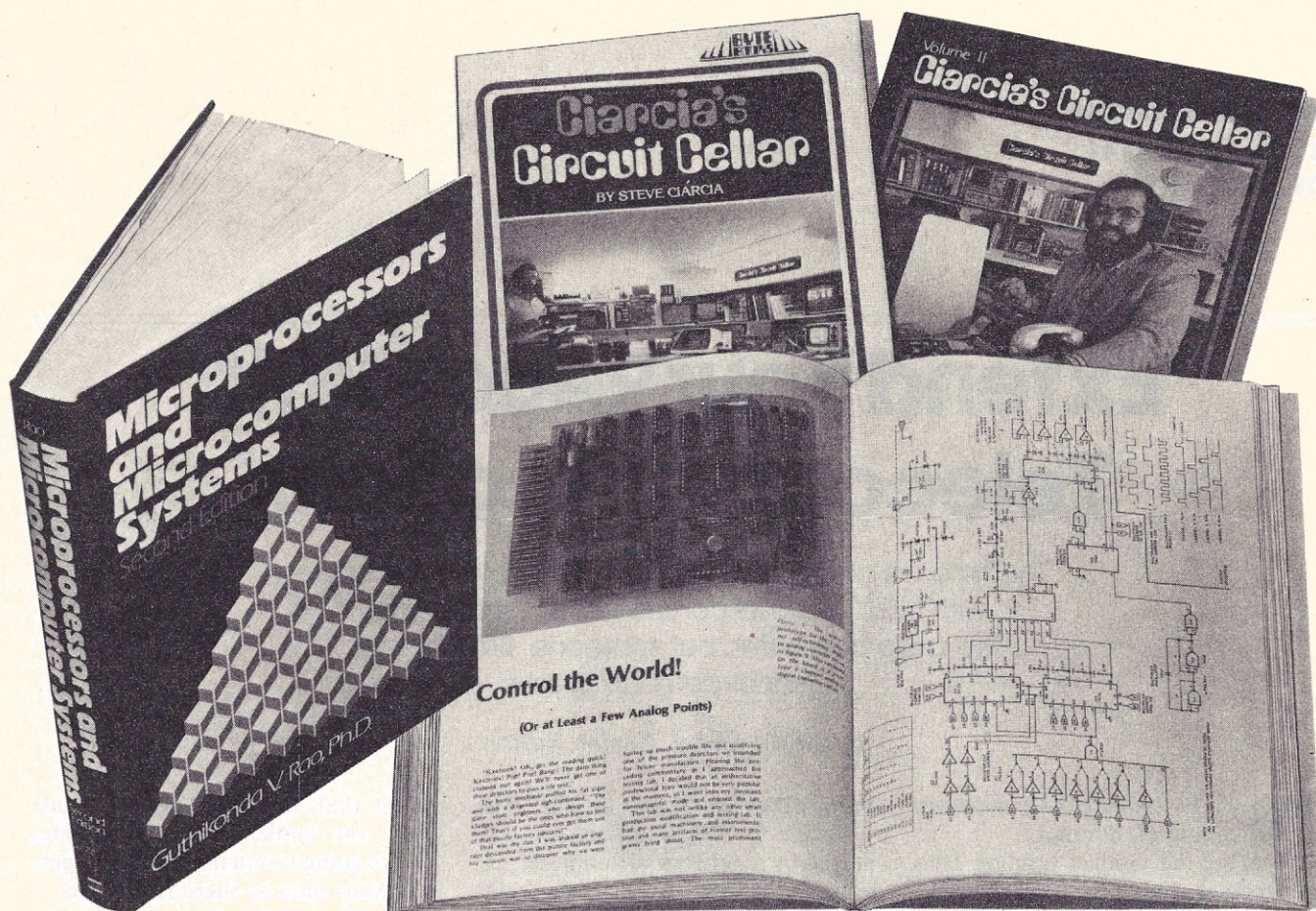
dustry, governments, the schools—all are wrestling over just what (and how much) you're supposed to learn about computing. So once more our implied national motto comes into play: If you want something done right, do it yourself.

We've shown a number of things you can do yourself, starting with your own computing education and moving on to your kids and your employees. Those you help will often become an informal user network that can be a tremendous help to you, later. As the Chinese philosopher Lao-tse said, “He who gathers, has little. He who scatters, has much.”

But as we've said, helping has to start with helping yourself. Each person helps our society just by becoming computing literate himself. Anything you do will rest, ultimately, on your efforts to gain and keep computing literacy. You're pursued by the stigma of becoming an obsolete professional if you don't, and you pursue the carrot of substantial personal advancement if you do. Don't worry if the peers you compete with razz you for diving into computing “prematurely.” Better for you to tell them how hard it is, actually. Above all, don't mention how competent many young graduates are with computing—the ones who'll be gunning for your job in a few years.

Right now, though, you have a head start on most business people. It won't last long. Unless you strive to maintain it. And think about the position of a non-computing manager in the job market of 1990....

Actually, how strongly you go for computing literacy could be one of the surest ways to gauge how much you value yourself. We've given you dozens of concrete things you can do—many of them right now—to advance your computing literacy. Lesser folk live by the notion of never putting off till tomorrow what you can do next week. But you value yourself too much to let your life dribble away like that...right? 



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Extend Your Reach With Telecommunications

The time will come when you want to talk to someone with your personal computer. Not something, like a big computer, but someone, like another personal-computing user.

by David Gabel, Senior Editor

"But I want to use my own computer, dammit."

That's Fred Golden talking. He's a personal-computer owner, and a senior writer for *Time* magazine. He wants to use his TRS-80 Microcomputer, Model III, to write his stories at home and then transmit the stories to *Time's* corporate typesetting system. When he found out that he couldn't do that, he was unhappy, as his comment above shows.

While Golden's final objective is communications with people—the readers of *Time* magazine—his intermediate objective is communications with a local network and, in that network, a computer. When you're trying to do that, you can run into trouble.

When he bought the system hardware from Radio Shack, Golden equipped his computer with enough disk drives to handle the chores he envisioned for it—principally, for now, researching and writing a book. But since he also purchased a modem, he figured, "What the heck, if I write for the magazine at home, then I can call the computer at work and simply send my stories over the telephone line."

What a terrific idea. There's only one problem. It didn't work. Golden's computer doesn't have a left-brace character on the keyboard. And the typesetting system that *Time* uses in New York needs that left brace at the start of a file, or else it just doesn't

recognize the start of the file.

People in *Time's* offices are connected by a network of computer terminals that hook up directly to the typesetting system. However, as Golden notes: "There aren't enough terminals to go around, so there are other people forced to go make it on their own. Some of the guys have TI Silent 700s, (portable terminals that, with built-in modems, allow over-the-phone communications, sometimes local storage, and nothing else). The TIs are filling in until there's a corporate decision as to how many terminals to put in, who gets them, and so on. But other guys, like me, are buying personal computers and trying to use them in the *Time* typesetting network."

In the meantime, "the typesetting guys seem a little threatened by all these personal computers," Golden says. He adds that while the people who handle the typesetting system are perfectly competent with that hardware, they really aren't sure of what to do with the personal computers that he, and others, want to use on the system, and how to handle the problems they can cause. Thus, their question to him, "Why don't you get a TI Silent 700?" And his reply, "But I want to use my own computer, dammit."

Golden's problem is not unique. It's probably fair to say that any time you try to hook up to someone's mainframe, or to someone's network to do

a job that the other person—your boss, the bank, etc.—wants done, you're going to run into problems getting your data to there from here.

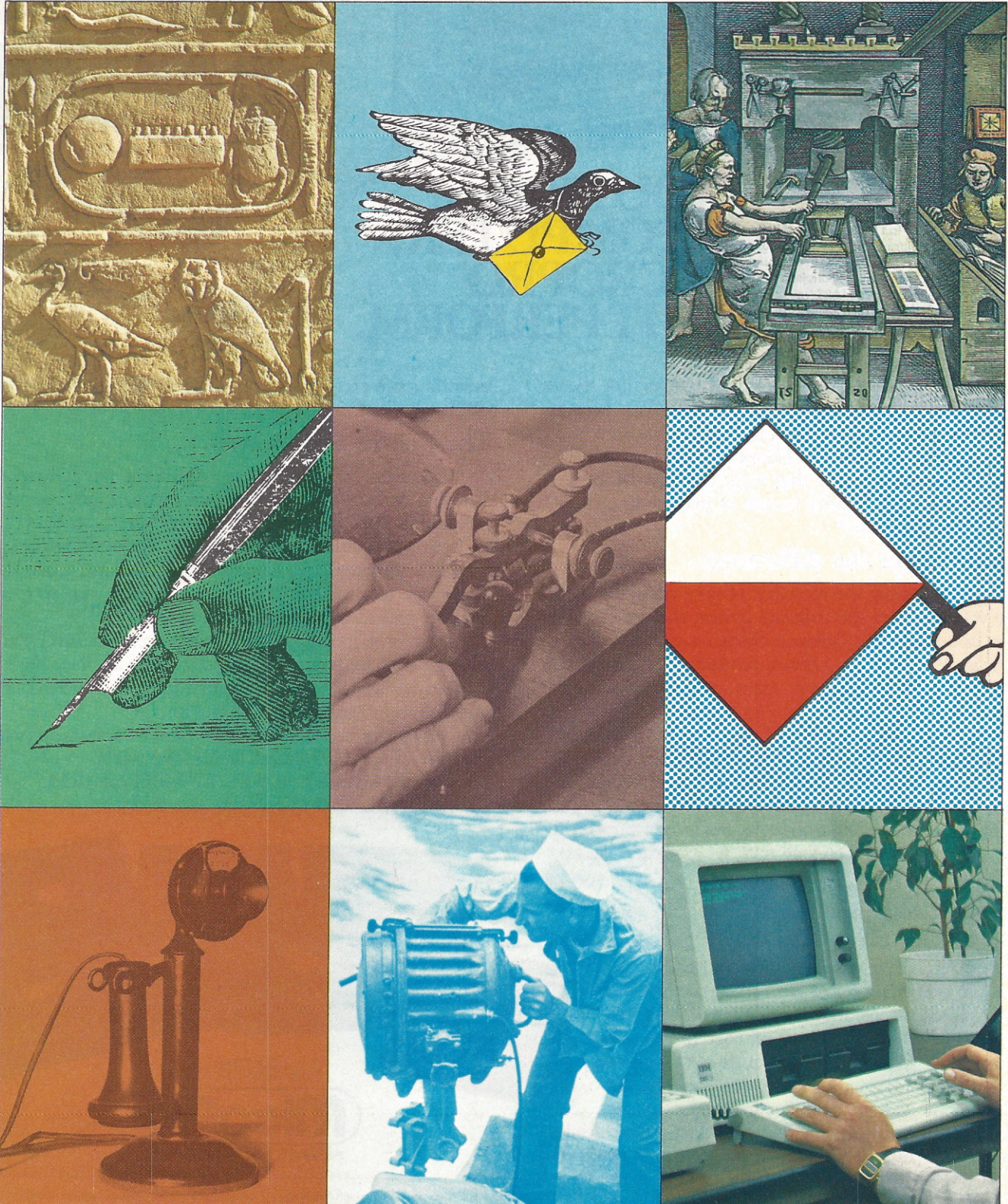
The first thing that you have to realize is that no matter how you want to use your computer to communicate, you'll wind up using a network. It might be Ma Bell's public telephone lines, it might be international long-distance lines, or it might be a local network. If you're a Ham, it could even be the Ham satellite. But all of these are networks. And any network has protocols and standards. You use Bell's protocols and standards when you dial the telephone. But you don't even have to think about the standards involved because the network was designed to allow people, not telephones, to communicate.

Until a few years ago, Ma Bell had an absolute monopoly in the telecommunications business in the United States—in both its communication lines and the hardware used. Then, at least in the hardware end of telecommunications, competition began to hammer on the walls. As a result, there are now lots of companies manufacturing equipment that connects to the Bell system.

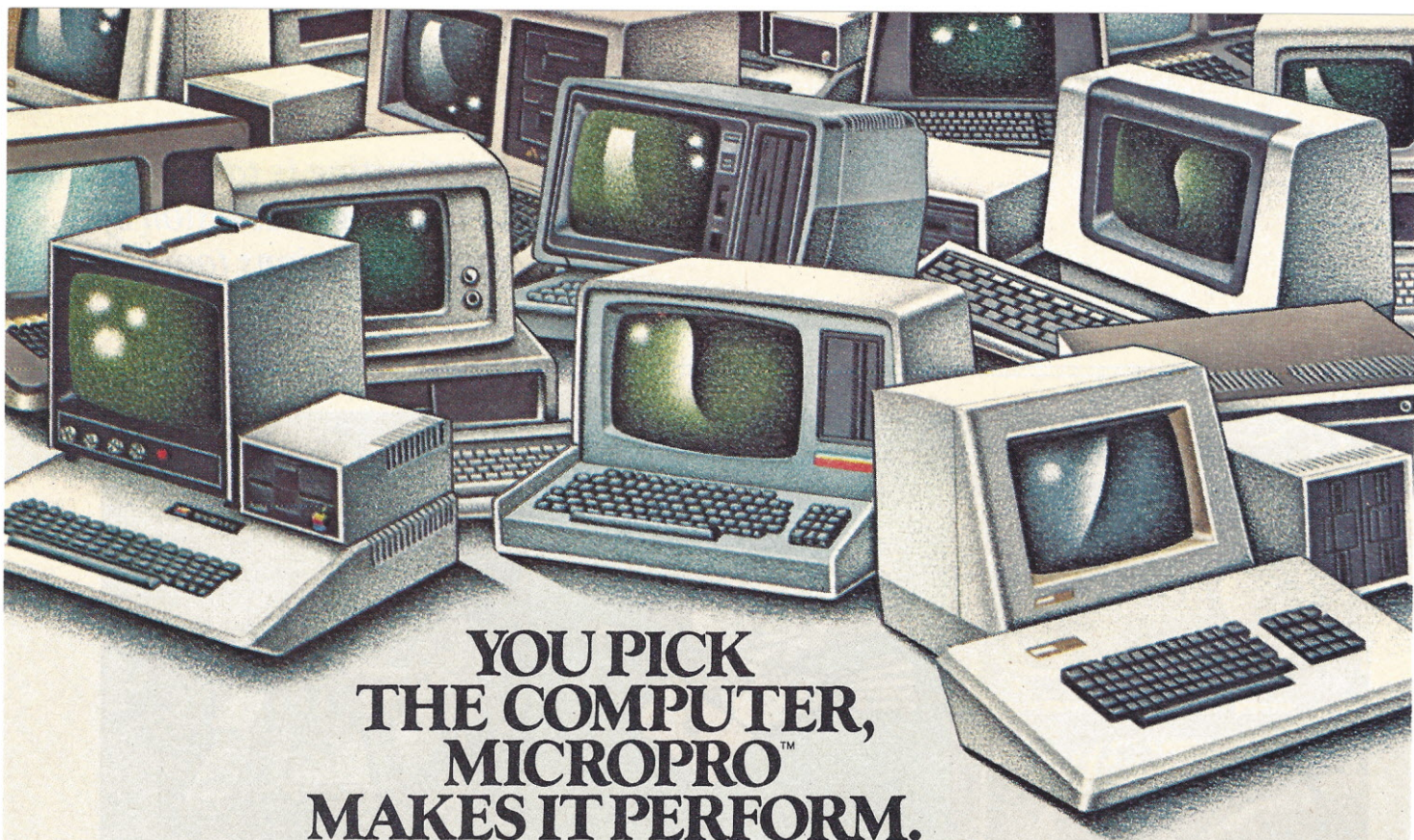
Protectionist

Bell argued, in the days of its monopoly, that it couldn't allow other companies to connect equipment to its public network because it had to pro

“Personal computing is taking its place in the long succession of communications tools.”



photos by H. Armstrong Roberts, The Bettmann Archive, Ewing Galloway, George B. Fry III



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PROFESSIONAL/ MANAGERIAL

protect the integrity of that network for the good of all its subscribers. This was a specious argument, of course, but one that somehow held for many years.

Still, Bell was right in its basic reasoning that there must be standards for the telephone network to be able to operate at all. And since Bell has the network, Bell makes the standards. Everyone who makes a device that connects to the Bell network (other telephone companies, modem manufacturers, answering-machine vendors and the like) has to comply with the standards that AT&T developed over the years—standards that are there to allow people to talk to other people. That's why you will read about devices that are "Bell 212A-compatible." Such equipment complies with Bell Standard 212A, which describes how the device connects to the network physically, the speed at which it operates (1200 baud

in this particular case) and other parameters. (A baud, by the way, is not a woman of ill-repute, but a unit of measure that can be taken, for our purposes, to mean one bit per second).

Until recently, the AT&T standard that those personal computer users involved in data communications were familiar with was Bell Standard 103. This is the one that 300-baud modems comply with, and, until recently, most modems for personal computers were 300-baud types. Now, however, faster 1200-baud modems are coming on the scene. Hayes Microcomputer Products has one, for example, that operates at that speed in full-duplex mode. Basically, that means that "conversation" can take place in two directions, as it does with a voice telephone. Novation has a similar modem.

Companies like Hayes and Nova-

tion wouldn't be able to sell these products if the phone company still had its hardware monopoly. But with the monopoly gone, personal-computer users don't have to purchase equipment from the phone company to get onto the telephone lines with their computers. Just get a modem (a modulator/demodulator, the device that changes computer signals to signals that can be transmitted down the telephone lines) that's Bell-compatible (no sweat, they all are) and you're in business.

Then comes the problem. Once you're on the phone network, you have to get your computer to interface with the computer at the other end. There's no universal standard for this interface. The only one that's even close is the American Standard for Information Interchange (ASCII) and all that does is specify what bit patterns will represent specific letters, digits and other characters. The various computer models have their own interfacing protocols. There's a different one for every manufacturer. Remember Golden's problem in getting his TRS-80 to communicate with Time's typesetting system? There's no standard that says his computer must be able to output a left brace, just as there's no standard that says the receiving computer has to know what's going on without that left brace. So Golden will have to make his computer as much like the terminals on Time's local network, or else just not participate in the benefits of this particular bit of institutional computing.

Since the standards for interfacing to mainframes vary from computer to computer, the best that you can hope to do, if such an interface is what you need, is to get the software that makes your computer into a terminal. Assuming that you have all the characters on your keyboard that you need, and that the mainframe has a program installed that lets it recognize dumb terminals (which is the way your computer will seem to the



Marshall Graham showing his computerized desk to a group of visitors, at the Hotel Roosevelt in New York City. Included in this workstation are two Commodore 8032s, two 8050 disk drives, an electronic blackboard and a tractor printer.

mainframe with terminal software running), you've got the problem licked. There are a host of terminal programs that run on various personal computers.

With such terminal programs, you've got the people-to-people communications problem licked, too, if the people in question use personal computers for their communications. If your personal-computer modem will dial and answer, and so will the other person's, then the computers will act just like two telephones. Except, of course, that the input is by keys, not voice.

Local Nets

Like the public network, with its special standards and protocols, each local network is a law unto itself. There are lots of local networks, and thus there are lots of laws. And it's paradoxical, but this diversity—which conventional wisdom would say can lead to greater individual freedom and increased competition—has led many institutions that set up in-house local networks to disdain true personal computing and force users to toe the institutional line.

Local networks, as the name implies, are localized collections of communications stations. In the case of local computer networks, the communications stations are often called workstations. A building, or a college campus, is a likely locale for supporting a local computer network.

If you haven't really been involved in personal computing, you're probably more familiar with Ethernet than any other network, because that's the one that Xerox has been advertising on television. Ethernet is a networking scheme that's supported by Xerox and Digital Equipment Corp., both vendors of personal computers, among other things, and Intel, a semiconductor manufacturer. With Ethernet, advertisements claim, a company could interconnect any number of devices in a building with

greater ease than hooking up a telephone.

It's really more accurate to say that adding stations to the Ethernet network is a snap after the homework has been done. The cables have to be installed, the interface modules put into place, the various pieces of hardware assembled, and the software that controls the whole shootin' match has to be attached. That's true of every local network.

There are a lot of questions to be asked before the homework is completed. Installing a network is no simple task. Different networks, for example, use different cabling. Ethernet uses coaxial cable, which allows the network to operate at very high speed, compared to Omnet, from Corvus, which uses twisted-pair cable, the cable the telephone company uses. Omnet runs at 1 Mbps (million bits per second); Ethernet operates at a ten-times-faster speed.

The Corvus Omnet is probably the network that is most familiar to personal computers users. Like the system from Nestar, which runs a network of Apples, and Arcnet, which connects TRS-80s, Omnet is specifically designed to operate with personal computers. Omnet can hook up many personal computers to each other, or to printers, large hard disks and other expensive peripherals. A network user is thus able to share the peripherals between all the connected computers, saving the cost of having to buy, say, a separate printer for each workstation. At the same time, network users are able to talk to one another. If there are computers in different buildings of a corporation, for instance, or on different floors of the same building, people can talk to one another via their computers. While this might not sound like such a big deal (they could always use the voice telephone circuits, or holler out the window), there are instances in which it can be a real boon. If, for example, the department head needs to look at budget figures

from each of his sub-heads, they can transmit the information to the boss without ever leaving their desks. And that information can even include graphs and charts, assuming the proper computing conditions exist.

In this kind of situation, people are using personal-computing communications as they should be used—for person-to-person communications.

Your Own Thing

Omnet can support several makes of computers. That is, Corvus will provide interface modules for The Apple II and III, The IBM Personal Computer, Commodore computers and others. That's great. But a problem arises when you try to interface an Apple, say, with an IBM Personal Computer on the same Omnet network. While users can get interface cards that will connect each computer to the network, the software that would allow the two machines to transfer files between themselves is still not truly available. Corvus says it has a utility program (part of the Omnet software that is carried by the Winchester disk, the core of the network) that takes data transmitted from one station on the network—an Apple II, for instance—and places it into a reserved area of the Winchester. From there, another station's computer—an IBM Personal Computer, for example—can retrieve the data. But Corvus says there may be some other programming required to accomplish this. Such statements are what lead network managers to become dictatorial when talking to people who want to, in Golden's words, "use my own computer, dammit." Institutions are loathe to exert the extra effort to allow truly personal access to the institutional network. After all, AT&T refused to let go of its information monopoly until the court said it had to.

One person who's considering using Omnet is Marshall Graham. Graham is a vice president of Environments, a New York-based office

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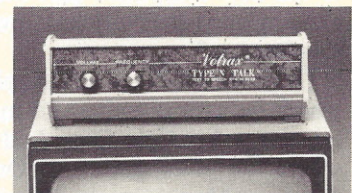
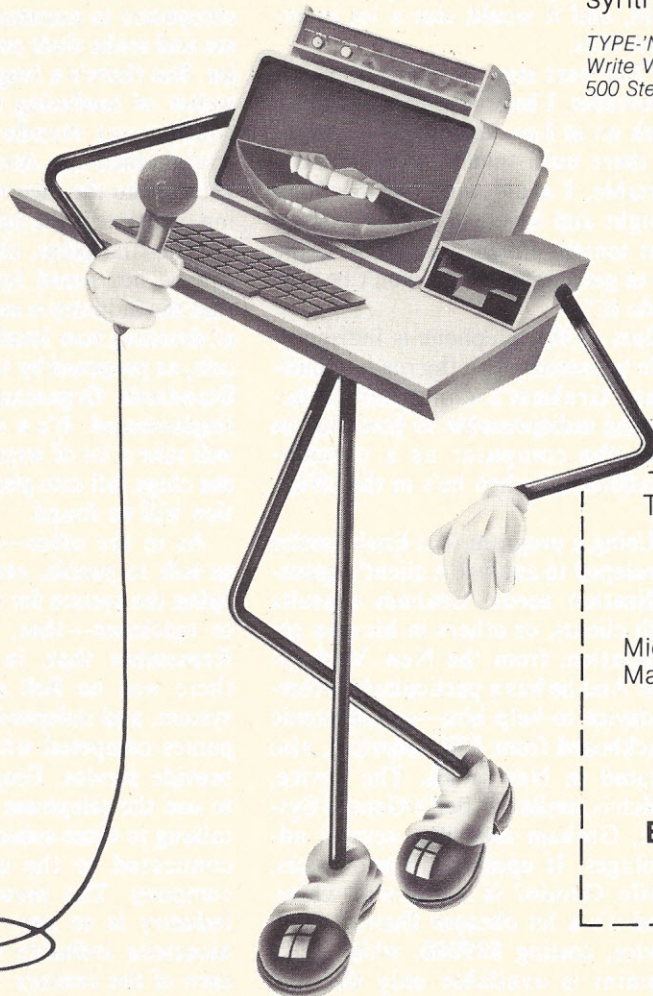
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design consulting firm with offices located around the country. Graham heads up the division that concentrates on office-of-the-future concepts, like the use of personal computing for various functions in the office. Graham practices what he preaches—he has not one, but two personal computers, Commodore 8032s, that are built into his desk. “I called Commodore,” he recalls, “and told them that I wanted to tear the computers apart. I didn’t like the fact that the keyboard was part of the unit, but I chose the Commodore because the display and keyboard were what I wanted. Commodore told me to go ahead. It was OK with them. And in the course of talking with them as I built the Commodores into my desk, they almost contracted me to consult on the human engineering of the new computers that they just announced at the National Computer Conference.”

Graham also has an Apple III, which he uses to build and manipulate large VisiCalc files. And that’s where his investigation of Omninet comes in. “I want to set up a network all around the country,” he says, “that will include the Apple III and all the Commodores our firm has. I’m just putting that material together now, and from my discussions with Corvus, I don’t think I’ll be able to swap files among the different kinds of computers. They seem to be saying the capability will not really be there until next spring.”

In the meantime. . .

Until that time comes, though, Graham is still using his computers for communicating, among other things. When *Personal Computing* caught up with him, he was in Seattle, Wash., where he was preparing a presentation for Puget Power and Light, one of Environetics’ clients. (PP&L, Graham says, is interested in setting up a network of personal computers.) Here’s how Graham’s personal computer multiplies his per-

sonal communications capabilities.

“I have to develop and deliver four major presentations and reports on this trip,” he reports. “Some of that includes cost proposals, on which I do all the editing myself. What I do is call my secretary, Yvette, and have her dump a similar proposal onto The Source (a popular information utility). When I get to one of our branch offices (for example, I’ll be in Los Angeles Friday), I’ll call The Source and download the proposal. From there I can edit it, cut it apart and put it back together again, and print it in final form. If I had tried to do that without communicating with a computer, it would have taken at least a week in shipping the thing back and forth, and it would cost a lot in express bills.

“The next step, Graham thinks, is a portable. I have a project I have to work on in Los Angeles, but I won’t be there until tomorrow. If I had a portable, I could work on the thing tonight and save a day. But I know that tonight I’ll be chomping at the bit to get started, and I won’t be able to do it.”

Just as the telephone is indispensable to executives on the road on business, Graham’s computer is becoming indispensable to him. But he uses the computer as a communications aid when he’s in the office, too.


Using a program that Environetics developed to analyze a client’s space-utilization needs, Graham consults with clients, or others in his own organization, from the New York office. And he has a particularly esoteric device to help him—an electronic blackboard from FTC Services, also located in New York. The device, which is similar to Bell’s Gemini System, Graham says, has several advantages. It operates in two colors, while Gemini is black-and-white. And it’s a lot cheaper than the Bell device, costing \$89000, while Bell’s Gemini is available only through lease at \$8900/month. New versions

of the device operate in six colors, so six people can be hooked up into a network, and all can draw in their individual color. Each conferee can also erase lines that he, or others, made, and all conferees see the results of this activity, too.

Saving valuable time

“I can do a lot of analysis (of my clients’ needs) right at my desk, now,” says Graham. “I just use the blackboard and bring up a screen of information, and talk on the phone at the same time. The combination is saving me about two hours a day.”

So it’s clear that professional managers, like Graham, and professional workers, like Golden, can use their computers to communicate with others and make their own jobs a lot easier. But there’s a long way to go. The welter of confusing (and sometimes conflicting) standards has to get straightened out. And people have to get used to the idea that people talking to people is the name of the game. On the first point, the standards, we can be heartened by the knowledge that the industry is now in the process of deciding how local-network protocols, as proposed by the International Standards Organization, are to be implemented. It’s a new area, and it will take a lot of wrangling before all the chips fall into place, but the solution will be found.

As to the other—allowing people to talk to people, rather than developing the system for machines to talk to machines—that, too, will come. Remember that, in the beginning, there was no Bell communications system, and independent phone companies competed with each other to provide service. People who wanted to use the telephone were limited to talking to those subscribers who were connected to the same telephone company. The personal computing industry is as new as the communications industry was before the turn of the century. Give it time. In the end, the people will out. 

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Big Four Accounting Software Roundup

Personal Computing presents a special report on the Big Four in accounting software—general ledger, accounts receivable, accounts payable and payroll, plus a complete guide to available packages, which begins on page 94

by Robert Cubbedge, Managing Editor

“Who should or should not use personal-computer ‘Big Four’ accounting software?”

The big man with the soft, intelligent voice echoed the question he’d just been asked, grinned somewhat sheepishly, and finally said:

“I’m gonna catch hell for this, but I’ve tried everybody’s software, and it’s simply not worth it for me to keep my books on a computer. We’re a low-volume, high-price company. I might have only 50 transactions a month. In addition to that, I have a payroll of only 10 or 12. I hate to say it, but for me—except for general ledger—computerized accounting just doesn’t make a lot of sense.”

The speaker was not, as you might expect, a moss-backed traditionalist, but rather Don French, president of Graham-Dorian Software Systems of

Fort Worth, Texas, one of the nation’s leading distributors of Big Four accounting software—general ledger, accounts receivable, accounts payable and payroll. Fortunately, though—for French and the software industry as a whole—that view is not endemic. Indeed, Americans last year purchased an estimated \$150 million worth of personal-computer accounting software, and the figure is expected to jump to \$2.5 billion over the next five years. And with good reason.

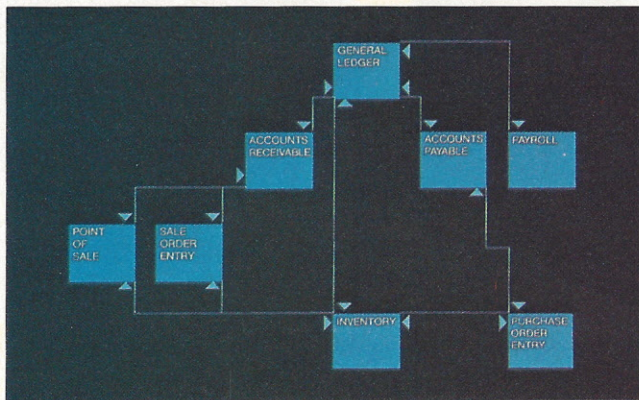
In order to merely survive in today’s marketplace, businesses large and small need instant access to the sort of financial data that only a computer can provide. They need to know not only that information, but how to manage it to their best advantage, as only a computer can show them

instantly, accurately every time. They need, in short, that extra measure of knowledge that will keep them even with—or maybe even a step ahead of—the competition.

“Who are ‘they’?” you ask. Who are the businessmen to whom personal computing can prove a godsend rather than just a new Space Age plaything?

To Graham-Dorian’s French, it’s anyone who has to draw up a payroll for 20 to 25 people, anyone who has on the order of 100 receivables a month—or, in fact, almost anyone who finds himself burdened by the task of keeping his books manually. Talk to others in the industry, though, and the answer you get is not just “anyone”—it’s practically everyone.

“It’s hard to set specific guide-



A fiscal flow chart headed by the Big Four in accounting software.



Whatever data you need can be summoned up at the touch of a button.

"To merely survive, businesses need instant access to the financial data that a computer can provide."

lines," says Ben Dyer, president of Peachtree Software of Atlanta, Ga. "If you go by number of employees, you might find someone who has only two or three people working for him but makes a lot of transactions, has a lot of data to handle. So, to a large extent, it has to be the judgment of the potential user."

And that, says Peggy Miller, Apple's product manager for small business, should include, "without reservation, absolutely anyone who owns a small business or has a business at home—a Tupperware distributor, consultant, writer, whatever."

You can't beat the price

John Moss, president of BPI Systems of Austin, Texas, is another executive who couldn't agree more. "In my opinion," he says, "there's not a business in the country that should not be using personal computing at today's prices. The greatest cause of business failure in this country—not just now but always—is lack of financial data on a timely basis. Now you can get it like you never could before by merely punching a few buttons."

"If you have a low-volume business and you're getting the data you need from your accountant in a cost-effective manner," adds Rick Mehrlich, president of Systems Plus of Palo Alto, Calif., "you may not need it. But the day you suddenly find that

your receivables are so stretched out that you don't have any money, that's the day when you have to start looking at personal computing."

"Cost-effectiveness is, of course, a factor," chips in David McFarling, president of Small Business Computer Systems of Lincoln, Neb., "but a person should not look at cost-effectiveness in terms of the immediate task at hand—because if he does truly use his computer, he'll soon find himself doing word processing, maybe expanding it to inventory, doing things that he really didn't think about when he bought it. A lot of people are still totally flabbergasted when they see all the stuff that's coming out."

"Let's say you're just a one-man business—a one-man band—but you have a large cash flow. An accountant can probably provide you with more and better information than you can get on a computer, but it takes him about 30 days. In 30 days, if something's wrong, you could be dead."

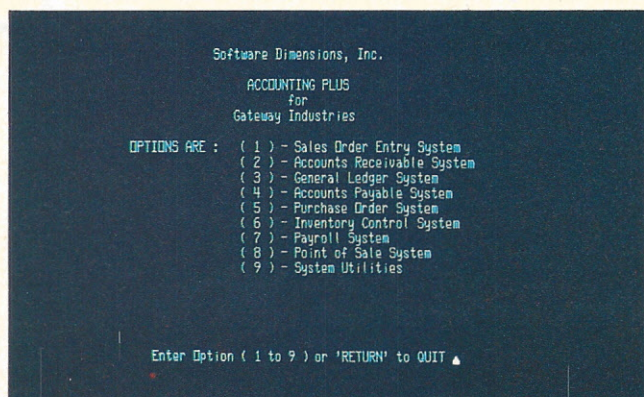
Look up the features

OK, you're convinced; you have a personal computer, or you plan to get one, to take advantage of the many packages available in Big Four accounting software. But which package—or which set of packages—will fill your needs best? To help you

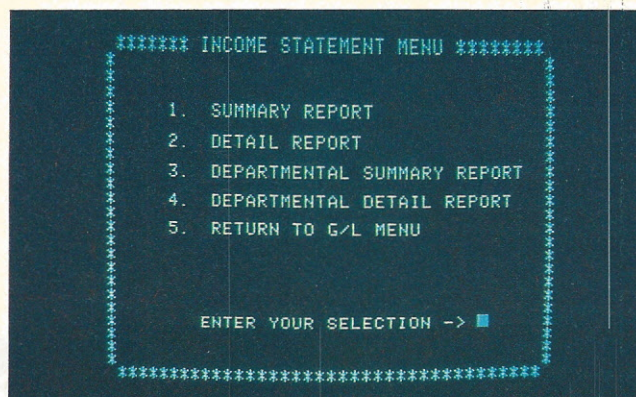
answer these questions, a series of charts, beginning on page 94, lists the salient features of many of the Big Four accounting packages now on the market. But before you take the plunge, there are still a few things you'd better be ready to discuss with your local salesman.

The first and most important point to consider is whether the package or group of packages you have in mind will actually do the job that you want them to do—and in the way you want them to do it. The only way to find out is to see them in action, to get a full demonstration. If they fill the bill, great. But, sad to say, what works well in a showroom sometimes fails to function at all when you get it out in the real world. So check carefully the ease of use of the package you choose, for here again you will find enormous variations.

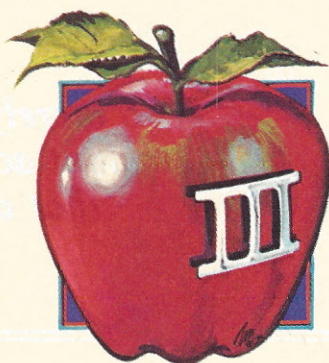
"We feel that our packages certainly should be easy to learn," says Bill Smith, marketing communications manager for Structured Systems Group of Oakland, Calif., "yet they should also be powerful enough to do serious accounting. As most people understand, there is a trade-off between something very simple and something very powerful and flexible. So we believe there is a certain amount of accounting knowledge that a user generally must have to do sophisticated accounting."



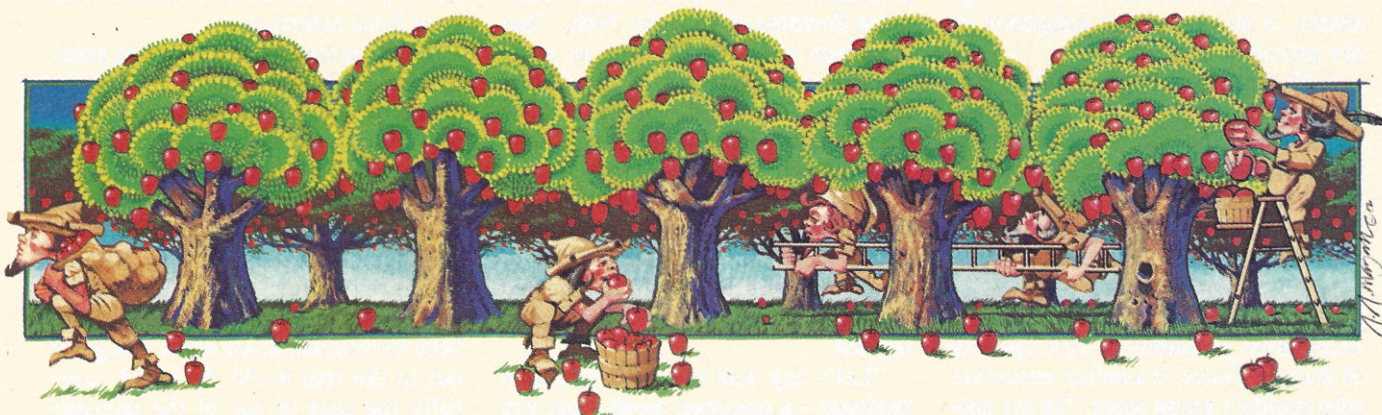
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SPECIAL REPORT

"Indeed, virtually every software distributor has something that's the best, or the most or the only one around."

```

*****
CMS SOFTWARE SYSTEMS INC
GENERAL LEDGER UPDATE REPORT
02/01/81
*****
* SRCE * DATE * REFERENCE * AMOUNT * SRCE * DATE * REFERENCE * AMOUNT *

11110.00 REVENUE BANK
  3 0215 14005 1520.00 3 0201 444 -10.00
  3 0201 450 -100.00 3 0201 11100 -100.00
  3 0201 11000 1500.00 3 0201 10500 105.00
  3 0201 CASH JNL 1079.71
P/R: 0 A/P: 0 A/R: 0 G/L: 7 OPENING BALANCE $ 160408.20
      $0.00 $0.00 $0.00 $3994.71 NET CHANGE 3994.71
      CLOSING BALANCE $ 164402.91

11150.00 PETTY CASH
  3 0201 5600 -246.67 3 0201 450 100.00
P/R: 0 A/P: 0 A/R: 0 G/L: 2 OPENING BALANCE $ 522.00
      $0.00 $0.00 $0.00 $-146.67 NET CHANGE -146.67
      CLOSING BALANCE $ 375.33

12110.00 FINISHED GOODS RECEIVABLE
  2 0101 RECEIVABL 1717.00 2 0101 RECEIVABL 115.00
P/R: 0 A/P: 0 A/R: 2 G/L: 0 OPENING BALANCE $ 65708.00
      $0.00 $0.00 $1832.00 $0.00 NET CHANGE 1832.00
      CLOSING BALANCE $ 67540.00

21140.00 SALES TAX PAYABLE
  2 0101 10012 20.00 2 0101 10008 5.00
  2 0101 10010 12.00 2 0101 10009 10.00
  2 0101 10011 20.00 2 0101 1111 5.00
P/R: 0 A/P: 0 A/R: 6 G/L: 0 OPENING BALANCE $ 2893.11
      $0.00 $0.00 $72.00 $0.00 NET CHANGE 72.00
      CLOSING BALANCE $ 2965.11

31100.00 SOFTWARE SALES
  3 0201 10500 50.00 3 0126 7003 99.99
  3 0120 7000 100.00 3 0122 7002 300.00
  3 0202 9001 200.00 2 0101 10011 400.00
  2 0101 10008 100.00
P/R: 0 A/P: 0 A/R: 2 G/L: 5 OPENING BALANCE $ 0.00
      $0.00 $0.00 $500.00 $749.99 NET CHANGE 1249.99
      CLOSING BALANCE $ 1249.99

31200.00 HARDWARE SALES
  3 0215 14005 1520.00 3 0201 10500 55.00
  3 0202 9001 250.00 3 0201 9000 1000.00
  3 0122 7002 350.00 3 0125 7001 222.22
  3 0205 9005 250.00 2 0101 10009 200.00

```

A general ledger update report from an accounting package distributed by CMS Software Systems.

At the opposite end of the scale, though, are accounting packages that claim to be so simple that almost anyone can use them. "I wouldn't say that a child would be able to step up and use one of our accounting packages," says Apple's Miller, "but I think any normal, intelligent person could. He's going to have to have some knowledge of business, but not necessarily bookkeeping."

BPI's Moss also prides himself, above all, on the ease of use of his product. "We've had people," he says, "from coast to coast and in many foreign lands, who've been able to open a set of books and keep them—people who have never done any bookkeeping before—because the computer can be programmed to do the basic work. That is the hallmark of our systems."

Which is right for you? Only you can decide. But before you do—before you sign on the dotted line—there are still some additional factors that you'd better take into account, and here are a few.

- Customization: It is unlikely that any package you choose will satisfy your needs in each and every respect now and forevermore. There will have to be some give and take. It's

SPECIAL REPORT

important, therefore, to find out whether your proposed software can be changed or modified as necessary, not only to meet your present needs but those that may arise at some later date.

• **Auditability:** Whatever type of accounting software you choose, you will likely need the help of a Certified Public Accountant or someone so qualified to advise you on matters such as depreciation, depletion, amortization and tax returns. To do that, he will need certain specific

facts and figures. Your accounting package must, therefore, meet minimum auditability and control standards.

• **Support services:** This may be the biggest single factor in your software's success. You wouldn't buy a copier or a computer without a maintenance contract, and software should be no different. You should be able to call the manufacturer whenever anything goes wrong, whenever you find yourself stuck, and get the help you need—now!

• **References:** Any comprehensive analysis of a software package must include the experiences of other users. This is necessary to determine the levels of customer support, product enhancement and performance that you can really expect in your own system. In other words, ask the man who owns one.

• **Cost:** The terms of your purchase, including not only price but rights, liabilities and product warranties, should be spelled out thoroughly to avoid surprises later on—if only to

ACCOUNTING SOFTWARE BUYERS' GUIDE

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(219) 879-4693
BusiComp/\$1500 includes all modules
Apple II
CIRCLE 350

ALTOS COMPUTER SYSTEMS
2360 Bering Dr.
San Jose, CA 95131
(408) 946-6700
Altos Accountant/\$2500 includes all modules, manuals, lessons
Altos Computers
CIRCLE 351

AMERICAN BUSINESS SYSTEMS
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FAS/dealers only
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Z80, Z8000, Z8086
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APPLE COMPUTER CO.
20525 Mariani Ave.
Cupertino, CA 95014
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The Controller/\$625 includes all modules
Apple II
CIRCLE 353

BPI SYSTEMS, INC.
3423 Guadalupe
Austin, TX 78705
(512) 454-2801
BPI Business Accounting Systems/\$395 each module
CBM 8032, Apple II, NEC PC 8000, IBM PC
CIRCLE 354

BUSINESS ENHANCEMENT COMPUSERVICE
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Suite 109
Escondido, CA 92027
(714) 741-6335
BEC Accounting IV/\$260 each module
Commodore 8032, 8050
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CHARLES MANN & ASSOC.
7594 San Remo Trail
Yucca Valley, CA 92284
(714) 365-9718
Job Cost Accounting/\$549.95 includes all modules
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CINCOM SYSTEMS, INC.
2300 Montana Ave.
Cincinnati, OH 45241
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SMART/\$950 includes all modules
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2204 Camp David
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(214) 285-3581
CMS/\$1700 includes all modules
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Micropay/\$140
Microrec/\$140
Micropers/\$140
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Accounts Receivable/\$395
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General Business System/\$2700 includes all modules
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Palantir/\$850 each module
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San Jose, CA 95134

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SBA/\$195 each module
Durango systems
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DYNACOMP
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Rochester, NY 14618
(716) 425-2833
Payfive/\$149.95 payroll only
Apple II
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GPS
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 Fargo, ND 58102
(701) 293-8483
Hardisk Accounting System/\$395 each module
Apple III, Corvus Concept, Apple II
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GRAHAM-DORIAN SOFTWARE SYSTEMS, INC.
P.O. Box 16355
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(817) 294-5042
TOPS-II/\$1000 each module (with source code), \$599 each module (without source code)
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CIRCLE 372

INNOVATIVE BUSINESS SOFTWARE
710 Williams Way
Richardson, TX 75080
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Los Angeles, CA 90025
(213) 826-4500
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INTERNATIONAL MICRO SYSTEMS
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Shawnee Mission, KS 66202
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Napa, CA 94558
(707) 252-7139
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Cromemco systems
CIRCLE 376

“Americans last year purchased about \$150 million worth of accounting software, and that will jump to \$2.5 billion over five years.”

make sure that “bargain” you like so much doesn’t cost you a bundle down the line.

Finally, each package must also be evaluated in terms of its ability to adapt to changes occurring in computer technology—as, for example, the introduction of 16-bit processors, instead of 8-bit, in many new machines. But what’s the difference between the two processors?

To Structured Systems’ Smith, not much—at least, at present. “The 16-bit processors don’t mean any-

thing yet,” he says. “For small business it could, in time, mean faster processing, a more realistic multiuser system. But until all of that extended RAM is addressable, the software manufacturers aren’t able to take advantage of it when they write their programs.”

That’s now. What about the future?

Present and future computing

“Presently,” says David McFarling, “a person can do all the things he

needs to do on an 8-bit processor. But with the cost of 16-biters not too much more than 8-bit machines, it gives you much more room to grow. At this point in time, they’re just coming in. They’re interesting, but the software for these machines is just over the horizon. When it comes, they may be the wave of the future.”

So you pay your money and take your choice. But what exactly do you get? So far we’ve been talking in generalities; now let’s get down to specifics, starting with general ledger.

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MBMS (CP/M)/\$100 each module
Monroe, Monroe CP/M
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includes all modules
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NEC HOME ELECTRONICS USA
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\$395 each module
NEC PC8000 Series
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Berkeley, CA 94710
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Prodigy Accounting
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San Rafael, CA 94903
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CIRCLE 400

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CP/M-based systems
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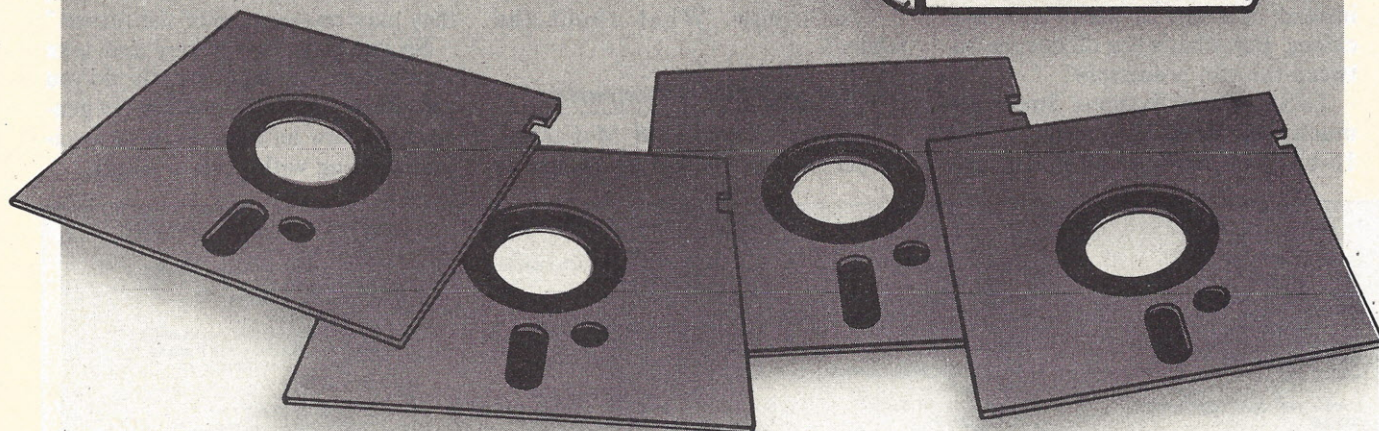
TCS SOFTWARE, INC.
3209 Fondren Rd.
Houston, TX 77063
(713) 977-7505
TCS Total/\$700 each module
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IBM PC, Olivetti M20
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TINY SYSTEMS INC.
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Numerous options are provided throughout the program to enable you to completely control all activities of THE SENSIBLE SPELLER. These include the ability to ignore both formatting commands and control codes, multiple options for the action taken with each misspelled word, and the use of multiple dictionaries. An alphabetical listing of misspelled, unknown, and/or all words in your document along with usage frequencies may be listed. A verification mode is provided to allow you to examine and dispense with misspelled words while viewing them in the actual context in which they appeared in your file. When you encounter an unknown word, you can even search the dictionary for the correct spelling (using wildcards). In the near future, Sensible Software will be releasing well known legal and medical dictionaries to complete this professional package.

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- the hard cover RANDOM HOUSE DICTIONARY, CONCISE EDITION

THE SENSIBLE SPELLER requires an Apple™ II/Apple™ II+ equipped with 48K, DOS 3.3, and 1 or 2 disk drives. Two disk drives are required to delete or add words to the dictionary. The price is only \$125.00.



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SPECIAL REPORT

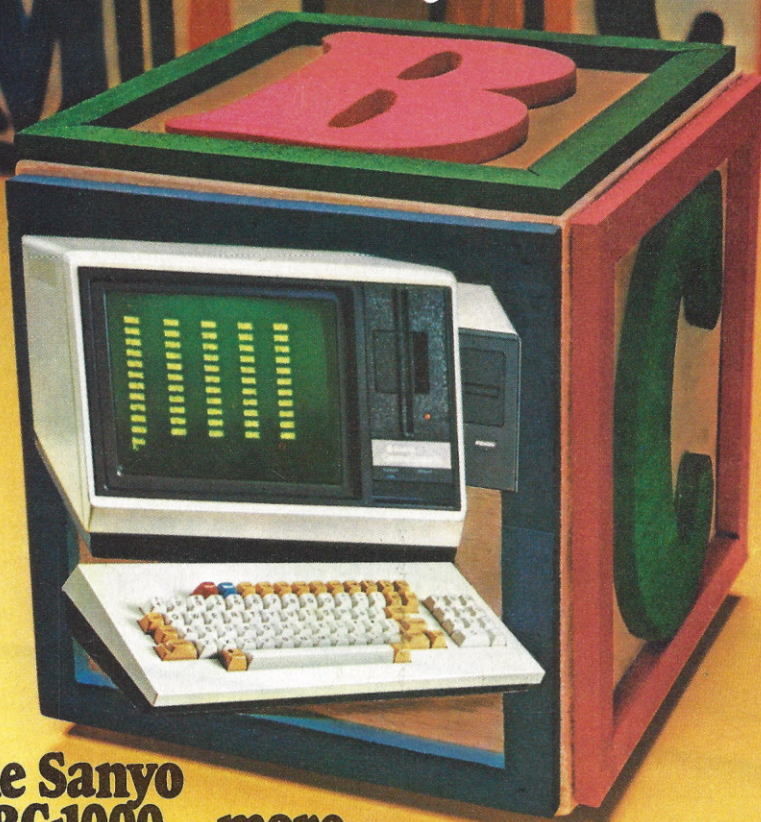
Put most simply, says Richard F. Lane of the accounting firm of Schierloh and Lane in Paramus, N.J., general ledger keeps track of how much business a company does and how it does it, and is thus the fundamental record of all its activities. Ideally, then, general ledger should:

- Provide detailed classification of data so that it may be recorded in functional accounts, as well as by individual department, cost center or other categories.
- Segregate transactions recorded during a current period from those of previous periods.
- Provide a printout of each account showing either all transactions from the beginning of the fiscal period on a balance forward from the previous processing, or all current transactions for the month or quarter.
- Provide an audit report of all entries to accounts that have not been previously set up in the master file.
- Print a trial balance that shows only the ending balance in each account without the details of any transaction (where time is a factor).
- Print a trial balance based on sub-accounts used for departmentalization or other purposes.
- Allow for an easy method of closing out income and expense accounts at the end of a fiscal period.
- Provide financial statements or other reports on a comparative basis with prior periods or budgets.
- Provide security over changes to the master file and produce an audit report of all changes.
- Be integrated with other sources of input that are part of the same system.

General ledger can thereby provide you with an assortment of fiscal "snapshots" of a company's financial condition. These snapshots are taken so a business owner or manager can gauge, evaluate or compare the company's financial performance at any time to its performance at any other

(continued on page 93)

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THE MBC-2000 AND 3000... FOR AN INDUSTRIAL ENVIRONMENT. Our larger "growth oriented" machines offer increased initial disc and graphics capacity and expandability through multi-bus slots. (By the time you're ready for these machines you'll understand all this jargon!)

SANYO SERVICE CENTERS COAST TO COAST. The Sanyo name means quality and first class service. Plus, we've extended our normal 90 day guarantee to one year on all memory boards.

SANYO—A NAME YOU CAN TRUST. Our full line is at your Sanyo dealer now. Or call the Sanyo Computer Div. at (800) 526-7043.

Desk-Top Business Computers by



SANYO

Sanyo Business Systems Corporation, 51 Joseph Street, Moonachie, N.J. 07074
CIRCLE 21



FRANKLIN **ACE** 1000

THE BEST DEAL IN TOWN!

THE FRANKLIN **ACE**1000

You just can't beat an ACE. Especially the Franklin ACE 1000. It's the professional personal computer with all the trump cards—it costs less, it includes 64K of RAM, upper and lower case, a numeric pad and VisiCalc® keys, all features not found on the Apple® II.

Peripherals that work with the Apple II will work with the Franklin ACE 1000. Programs that run on the Apple will run on the ACE. Totally Apple compatible . . . yet, so much more!

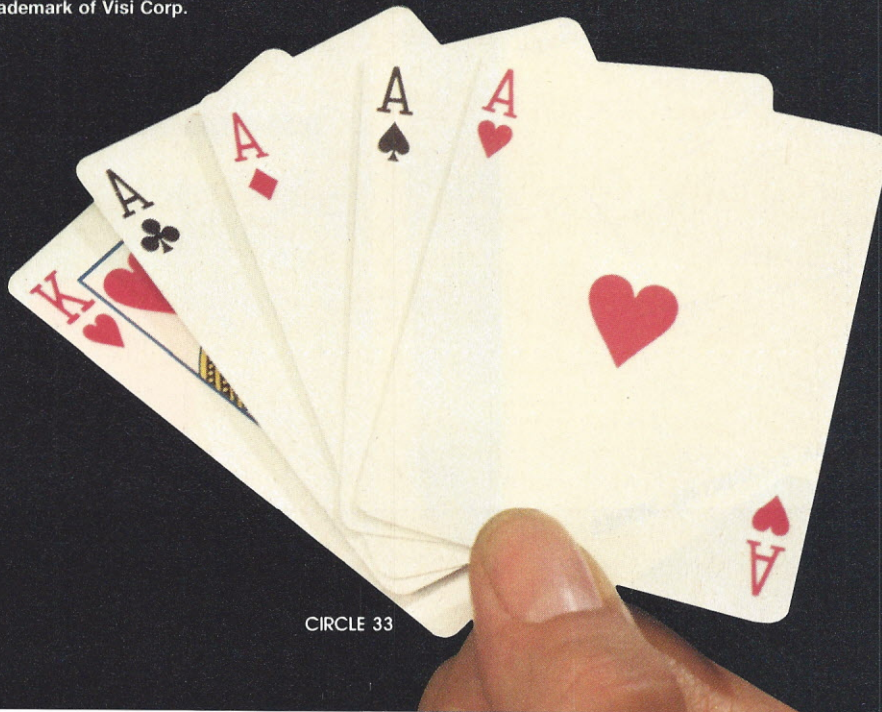
The Franklin Ace 1000—price, power, quality, reliability—the best deal in town. Call or write today for the name of your local authorized Franklin dealer.



FRANKLIN
COMPUTER CORPORATION

7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

Franklin ACE is a trademark of Franklin Computer Corporation
Apple is a registered trademark of Apple Computer Inc.
VisiCalc is a registered trademark of Visi Corp.

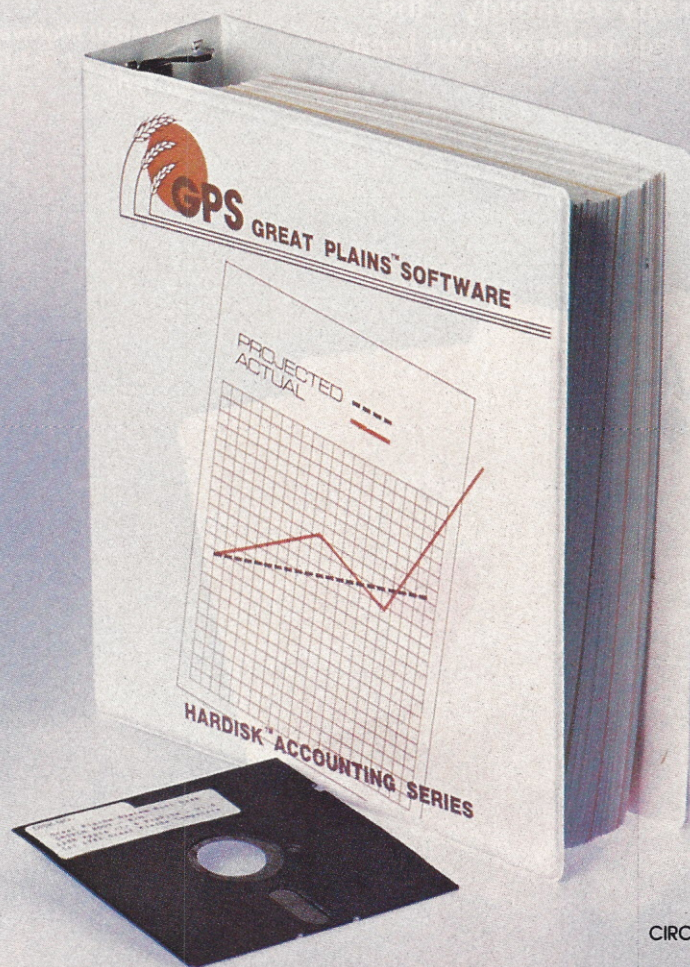


CIRCLE 33

Good Company for a Hard Disk

Hard disk usage is starting to boom. Computer owners are demanding instant output and more flexibility in order to take advantage of today's advanced computers.

Great Plains Software, in anticipation of these growing needs, created a comprehensive hard disk accounting/management system for progressive businesses who expect to grow.



Immediate response at your fingertips – a complete data base of every journal entry posted during fiscal year, CRT display of accounts payable, accounts receivable, customer and vendor records. Other features include budgeting, payroll, inventory, plus much more. Great Plains Software systems expand with your company. Built-in password keeps all information private and confidential. Documentation manual includes easy to follow step-by-step procedures. Screen display/manual cross reference simplify operation.

Great Plains Software is designed specifically for businesses requiring in-depth results **today** and anticipate a growth potential in the **future**.

Your computer store has the details on Great Plains' advanced hard disk software systems – or for personal service, call (701) 293-8483.

OVERALL

- Password privacy system standard
- Written in UCSD Pascal*
- Hard disk oriented

*TM UC Regents

G/L

- All entries on line entire fiscal year
- Flexible format financial statements
- Comparative income statements

A/R

- Up to 9999 customers
- Profit by customer, customer type, salesman and state
- Open item or balance forward
- Instant screen inquiry
- Automatically posts to G/L

A/P

- Up to 9999 vendors
- Instant screen inquiry
- Automatically posts to G/L

PAYROLL

- Up to 9999 employees
- Up to 25 deductions per employee
- Withholding computed
- Prints W2, 941 & checks

INVENTORY

- FIFO, LIFO, standard cost, weighted moving average or serial number valuation
- 5 price levels per part
- Concise report including profit by part and line
- Point of sale "cash register" program included

*Advanced Software Systems
for Today and Tomorrow*



Great Plains Software
123 15th Street N., Fargo, N.D. 58102
(701) 293-8483

SPECIAL REPORT

"I wouldn't say that a child would be able to use one of our accounting packages, but I think any intelligent person would."

DETAILED ALPHABETIC CLIENT MASTER REPORT

ACCOUNT NUMBER: 100001				PRO:SAM JONES	
ACME TRAVEL	ACCT: COMMERCIAL			CREDIT BAL:	0.00
2323 MONTANA	BUS : TRAVEL AGENCY			ACCOUNT TYPE: 1	
ST. LOUIS MO 63145	MISC: NONE				
TELEPHONE #: 314-444-9922	*****			*****	
00012345	10/05/81	1750.00	550.00	10/05/81	1200.00
00000003	10/05/81	250.00	0.00	00/00/00	250.00
CLIENT TOTAL		2000.00	550.00	1450.00	

ACCOUNT NUMBER: 200002				PRO:KAREN BLACK	
ANDERSON, WILLIAM	ACCT: PERSONAL			CREDIT BAL:	0.00
9823 NORTH AVENUE	BUS : MACHINIST			ACCOUNT TYPE: 1	
ST. LOUIS MO 66666	MISC: 10/01/50				
TELEPHONE #: 314-444-1123	*****			*****	
00000001	10/05/81	1000.00	250.00	10/05/81	750.00
00000004	10/05/81	250.00	25.00	10/05/81	225.00
CLIENT TOTAL		1250.00	275.00	975.00	

ACCOUNT NUMBER: 400004				PRO:MILES JOHNSON	
JACKSON, GEORGE	ACCT: PERSONAL			CREDIT BAL:	2500.00
2341 WESTLINE	BUS : CARPENTER			ACCOUNT TYPE: 1	
ST. LOUIS MO 63145	MISC: 12/01/56				
TELEPHONE #: 314-654-2342	*****			*****	
CLIENT TOTAL		0.00	0.00	0.00	

ACCOUNT NUMBER: 300003				PRO:DAVID JONES	
WILSON SPORTS ARENA	ACCT: COMMERCIAL			CREDIT BAL:	500.00
2388 JANEAU	BUS : SPORTS			ACCOUNT TYPE: 0	
ST. LOUIS MO 66234	MISC:			NO BILLING MESSAGES	
TELEPHONE #: 314-923-9923	*****				

A typical accounts receivable printout from a package offered for sale by Univair International.

BIG FOUR ACCOUNTING

(continued from page 89)

time. General ledger also puts financial information into common formats, so everyone has the same points of reference.

This simple description of general ledger belies, of course, the complexities that even a small business may encounter in keeping track of its financial books. Within the general

ledger function are subfunctions, including accounts receivable, accounts payable and payroll. But, of course, in companies with sufficient sales and transaction volume, these subfunctions are divided into their own departments or units.

Nourishment for receivables

Of these, accounts receivable is perhaps the most important, for it is tru-

ly the lifeblood of most businesses. It is the basic, complete and accurate record of all money owed to and received by a business, along with who owes that money. Like your own blood, it must be given the proper "nourishment" to keep it alive. An exemplary accounts receivable package, therefore, should:

- Produce customer invoices and

(continued on page 101)

SPECIAL REPORT

General Ledger Features

COMPANY/PACKAGE	PRINTED REPORTS Trial Balance	Journal Entry	Detail General Ledger	Balance Sheet	Profit & Loss	Departmental	NUMBER OF COMPANY ENTRIES	NUMBER OF GENERAL ENTRIES	PRINT OUT SEPARATE ACCOUNTS	LIST TRANSACTIONS SEPARATELY	PERIODIC CUMULATIVE REPORTS	CUSTOMIZED FOR EACH COMPANY	CAN PACKAGE BE USED IN FIRST OR SECOND MONTH OF NEXT FISCAL YEAR
ADVANCED OPERATING SYSTEMS BusiComp	•	•	•	•	•		#	#	•	•	•	•	•
ALTOS COMPUTER SYSTEMS Altos Accountant	•	•	•	•	•	•	#	#	•	•	•	•	•
AMERICAN BUSINESS SYSTEMS FAS	•	•	•	•	•	•	25	9999	•	•	•	•	•
BACS	•	•	•	•	•	•	99	#	•	•	•	•	•
APPLE COMPUTER The Controller	•	•	•	•	•	•	50	700	•	•	•	•	•
BPI SYSTEMS, INC. BPI Business Accounting Systems	•	•	•	•	•	•	400	#	•	•	•	•	•
BUS. ENHANCEMENT COMPUSERVICE BEC Accounting IV	•	•	•	•	•	•	#	750-1250	•	•	•	•	•
CHARLES MANN & ASSOC. Job Cost Accounting	•	•	•	•	•		250/disk	300/disk	•	•	•	•	•
CINCOM SYSTEMS, INC. Smart	•	•	•	•	•	•	#	†	•	•	•	•	•
CMS SOFTWARE SYSTEMS, INC. CMS	•	•	•	•	•	•	99	500	•	•	•	•	•
COMPUMAX Microledger	•	•	•	•	•	•	1	#	•	•	•	•	•
Maxilegger	•	•	•	•	•	•	9	#	•	•	•	•	•
COMPUTER PRODUCTS INT'L General Ledger	•	•	•	•	•	•	1/disk	2,000- 3,000	•	•	•	•	•
COMPUTER SYSTEMS DESIGN General Ledger	•	•	•	•	•	•	99	#	•	•	•	•	•
H & E COMPUTRONICS Versalegger	•	•	•	•	•	•	†	†	•	•	•	•	•
CONTINENTAL SOFTWARE Computer Prog. Acct.	•	•	•	•	•	•	#	150	•	•	•	•	•
CYMA General Business System	•	•	•	•	•	•	#	#	•	•	•	•	•
Small Business System	•	•	•	•	•	•	32,000 †disk	32,000 †disk	•	•	•	•	•
DAKIN 5 CORP. The Controller	•	•	•	•	•	•	9	1000/mo	•	•	•	•	•
DATA TRAIN, INC. Bookkeeper Series	•	•	•	•	•	•	#	#	•	•	•	•	•
Superchief Series	•	•	•	•	•	•	†	†	•	•	•	•	•
Accountant Series	•	•	•	•	•	•	#	#	•	•	•	•	•
DENVER SOFTWARE CO. Financial Partner	•	•	•	•	•		150	100			•	•	•
DESIGNER SOFTWARE Palantir	•	•	•	•	•	•	#	#	•	•	•	•	•
DURANGO SYSTEMS SBA (Small Business Applications)	•	•	•	•	•	•	#	#	•	•	•	•	•
GPS Hardisk Accounting System	•	•	•	•	•	•	#	#	•	•	•	•	•
GRAHAM-DORIAN SOFTWARE TOPS-II	•	•	•	•	•		1	#	•	•	•	•	•
INNOVATIVE BUSINESS SOFTWARE IBS	•	•	•	•	•		99	#	•	•	•	•	•
INTER-CARE Inter-Care Accounting Package	•	•	•	•	•	•	999	#	•	•	•	•	•
INTERNATIONAL MICRO SYSTEMS IMS Fin. Software Series	•	•	•	•	•	•	98	#	•	•	•	•	•
LEAR DATA Tristar Business System	•	•	•	•	•	•	#	10,000	•	•	•	•	•
LIFEBOAT ASSOC. The Boss	•	•	•	•	•	•	#	9000	•	•	•	•	•

Accounts Receivable Features

COMPANY/PACKAGE	PRINTED REPORTS Trial Balance	Journal Entry	Detail General Ledger	Balance Sheet	Profit & Loss	Departmental	NUMBER OF COMPANY ENTRIES	NUMBER OF GENERAL ENTRIES	PRINT OUT SEPARATE ACCOUNTS	LIST TRANSACTIONS SEPARATELY	PERIODIC CUMULATIVE REPORTS	CUSTOMIZED FOR EACH COMPANY	CAN PACKAGE BE USED IN FIRST OR SECOND MONTH OF NEXT FISCAL YEAR
MANAGEMENT ACCOUNTABILITY GR. MAGIS	•	•		•	•	•	9	385	•	•	•	•	•
MICRO-ARCHITECT, INC. Integrated Acctg. Package	•	•	•	•	•	•	1	3000	•	•	•	•	•
MICRO BUSINESS SOFTWARE, INC. MBSI	•	•	•	•	•	•	1	#	•	•	•	•	•
MICROCOMPUTER CONSULTANTS General Ledger	•	•	•	•	•	•	#	32,000	•	•	•	•	•
MICRO-ED General Accounting Package	•	•	•	•	•		1/disk	#	•	•	•	•	•
MONROE SYSTEMS FOR BUSINESS MBMS	•	•	•	•	•	•	1	9	•	•	•	•	•
MBMS CP/M	•	•	•	•	•	•	#	9	•	•	•	•	•
NATIONAL SOFTWARE SYSTEMS General Ledger	•	•	•	•	•	•	#	#	•	•	•	•	•
NEC HOME ELECTRONICS USA NEC General Accounting Syst.	•	•	•	•	•	•	10	1000	•	•	•	•	
NORTH STAR COMPUTERS Accpac	•	•	•	•	•	•	#	#	•	•	•	•	•
PEACHTREE SOFTWARE Peachpak 40	•	•	•	•	•	•	#	750	•	•	•	•	
Peachpak 8	•	•	•	•	•	•	#	↑	•	•	•	•	
Peachpak 4	•	•	•	•	•	•	•	800/ 8" disk	•	•	•	•	
PRODIGY SYSTEMS, INC. Prodigy Acctg. Package	•	•	•	•	•	•	999	#	•	•	•	•	•
QUEST, INC. Quest Accounting Software	•	•	•	•	•	•	#	#	•	•	•	•	•
RADIO SHACK Acctg. Package (Single Disk)	•	•	•	•	•	•	504	11,420	•	•	•	•	•
(Triple Disk)	•	•	•	•	•	•	#	#	•	•	•	•	•
SIERRA NATIONAL CORP. Starbase Acctg. System	•	•	•	•	•	•	99	#	•	•	•	•	•
SMALL BUSINESS COMPUTER SYST. General Ledger	•	•	•	•	•	•	#	1000	•	•	•	•	•
SMALL BUSINESS SYSTEMS GROUP General Ledger	•	•	•	•	•		1	#		•	•	•	on Altos
SOFTWARE HOWS DBI	•	•	•	•	•	•	1	#	•	•	•	•	•
SOFTWARE TECH. FOR COMPUTERS General Ledger	•	•	•	•	•	•	700	250	•	•	•	•	•
STAR COMPUTER SYSTEMS General Ledger	•	•	•	•	•	•	400	#	•	•	•	•	
STATE OF THE ART General Ledger	•	•	•	•	•	•	†	†	•	•	•	•	•
STRUCTURED SYSTEMS GROUP Structured Syst. Acctg. Pack.	•	•	•	•	•	•	300-600	550-1000	•	•	•	•	•
SYSTEMS PLUS INC. Accounting Plus	•	•	•	•	•	•	#	65,000		•	•	•	•
Accounting Plus II	•	•	•	•	•	•	to 1000	to 3000		•	•	•	•
TARANTO & ASSOC. General Ledger	•	•	•	•	•	•	#	#	•	•	•	•	•
TCS SOFTWARE, INC. TCS Total Ledger	•	•	•	•	•	•	#	#	•	•	•		•
TCS Big-Four	•	•	•	•	•	•	1/disk	#	•	•	•		
TINY SYSTEMS INC. Microledger Accounting System	•	•	•	•	•		#	#		•	•	•	•
UNIVAIR INTERNATIONAL Univair Series 9000	•	•	•	•	•	•	246	#	•	•	•	•	•
VANDATA Vandata Business Package	•	•	•	•	•	•	#	#	•	•	•	•	•

limited only by disk capacity
† unlimited

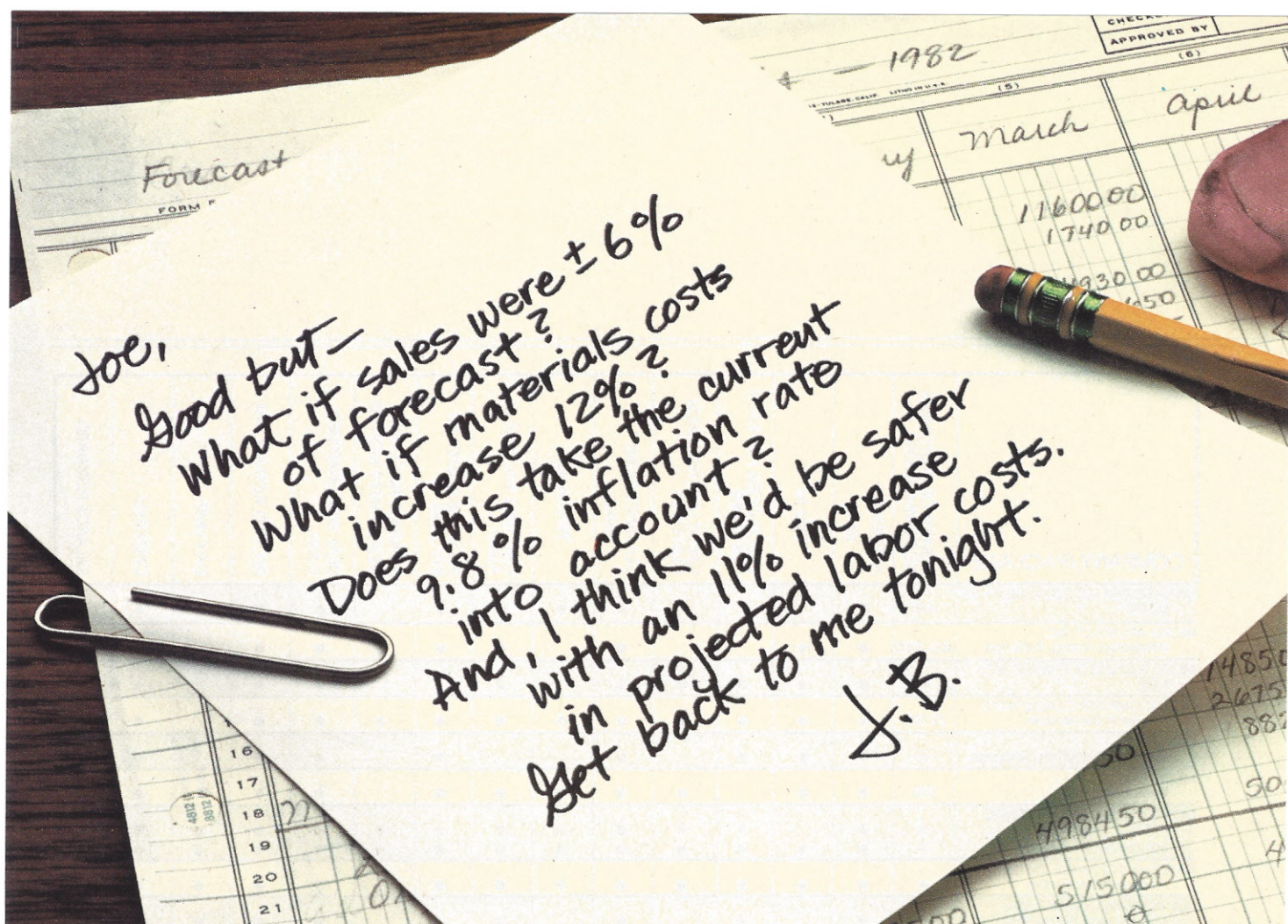
SPECIAL REPORT

Accounts Receivable Features

COMPANY/PACKAGE	NUMBER OF CUSTOMERS ACCOMMODATED	ADDRESSES Bill to	Ship to	CREDIT CODE FOR EACH CUSTOMER	CREDIT LIMIT FOR EACH CUSTOMER	CLASSIFICATIONS Retail	Wholesale	CAN TRIAL BALANCE BE AGED	PRODUCE CUSTOMER INVOICES	SEPARATE ACCOUNTS MORE THAN 9 MONTHS	DEAL WITH UNAPPLIED CASH	RECORD ACTIVITY DAILY	DAY LIMIT	OPEN ITEM	BALANCE FORWARD
ADVANCED OPERATING SYSTEMS BusiComp	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ALTOS COMPUTER SYSTEMS Altos Accountant	#	•	•	•	•	•	•	•	•		•	•	•	•	•
AMERICAN BUSINESS SYSTEMS FAS	9,999	•	•	•	•	•	•	•		•	•	•	•	•	•
BACS	#	•	•	•	•	•	•	•		•	•	•	•	•	•
APPLE COMPUTER The Controller	250	•		•	•	•	•	•		•		•			•
BPI SYSTEMS, INC. BPI Business Accounting Systems	700	•	•	•		•		•	•		•	•	•	•	•
BUS. ENHANCEMENT COMPUSERVICE BEC Accounting IV	750	•	•	•		•	•	•	•			•			•
CHARLES MANN & ASSOC. Job Cost Accounting	2500	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CINCOM SYSTEMS, INC. Smart	500-3000	•	•	•	•	•	•	•	•	•		•			•
CMS SOFTWARE SYSTEMS, INC. CMS	1800	•	•					•			•		•		•
COMPUMAX Microrec	#	•		•	•	•	•	•	•	•	•		•		•
COMPUTER PRODUCTS INT'L Receivables	400+	•	•	•	•	•	•	•	•	•	•	•	•	•	•
COMPUTER SYSTEMS DESIGN Receivables	#	•				•		•	•			•		•	•
H & E COMPUTRONICS Versareceivables	†	•	•		•	•		•	•		•	•	•	•	•
CONTINENTAL SOFTWARE Computer Prog. Acct.	300	•	•	•	•	•	•	•	•		•	•		•	•
CYMA CORPORATION General Business System	4500	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Small Business System	10,000	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DAKIN 5 CORP. The Controller	250/disk	•				•	•	•			•	•			•
DATA TRAIN, INC. Bookkeeper Series	†	•	•	•		•		•	•		•	•		•	•
Superchief Series	†	•	•	•	•	•		•	•	•	•	•	•	•	•
Accountant Series	†	•	•	•		•		•	•		•	•		•	•
DESIGNER SOFTWARE Palantir	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DURANGO SYSTEMS SBA (Small Business Applications)	#	•			•	•	•	•			•	•		•	•
GPS Hardisk Accounting System	9,998	•	•	•	•	•	•	•			•	•		•	•
GRAHAM-DORIAN SOFTWARE TOPS-II	#	•	•			•		•		•	•	•		•	
INTER-CARE Inter-Care Accounting Package	#	•	•	•	•	•		•	•		•	•		•	•
INTERNATIONAL MICRO SYSTEMS IMS Fin. Software Series	#	•		•	•	•		•		•	•	•		•	•
LEAR DATA Tristar Business System	#	•	•	•	•	•	•	•	•		•	•		•	•
LIFEBOAT ASSOCIATES The Boss	9,000	•	•		•	•		•			•	•	•	•	•

COMPANY/PACKAGE	NUMBER OF CUSTOMERS ACCOMMODATED	ADDRESSES Bill to	Ship to	CREDIT CODE FOR EACH CUSTOMER	CREDIT LIMIT FOR EACH CUSTOMER	CLASSIFICATIONS Retail	Wholesale	CAN TRIAL BALANCE BE AGED	PRODUCE CUSTOMER INVOICES	SEPARATE ACCOUNTS MORE THAN 9 MONTHS	DEAL WITH UNAPPLIED CASH	RECORD ACTIVITY DAILY	DAY LIMIT	OPEN ITEM	BALANCE FORWARD
MANAGEMENT ACCOUNTABILITY GR. MAGIS	500	•				•	•	•	•		•	•		•	•
MICRO-ARCHITECT, INC. Integrated Acctg. Package	400-3000	•	•			•		•	•		•	•		•	•
MICRO BUSINESS SOFTWARE, INC. MBSI	#	•	•	•	•	•		•			•	•		•	•
MICROCOMPUTER CONSULTANTS Accounts Receivable	32,000	•	•	•	•	•	•	•	•	•	•	•		•	•
MICRO-ED General Accounting Package	#	•	•	•		•			•		•	•		•	
MICRO LAB Invoice Factory	550	•	•		•	•	•	•	•		•	•	•	•	
MONROE SYSTEMS FOR BUSINESS MBMS	#	•		•	•	•	•	•	•	•	•	•	•	•	•
MBMS (CP/M version)	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NATIONAL SOFTWARE SYSTEMS Accounts Receivable	#	•	•	•	•	•	•	•	•		•	•	•	•	•
NEC HOME ELECTRONICS USA NEC General Accounting Sys.	600	•		•		•		•			•	•	•	•	•
NORTH STAR COMPUTERS ACCPAC	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PEACHTREE SOFTWARE Peachpak 40	500	•						•	•		•	•		•	•
Peachpak 8	†	•		•	•			•	•		•	•		•	•
Peachpak 4	800	•						•	•		•	•		•	•
PRODIGY SYSTEMS, INC. Prodigy Acctg. Package	#	•	•	•		•	•	•	•	•	•	•		•	•
QUEST, INC. Quest Accounting Software	#	•	•	•	•	•	•	•	•	•	•	•		•	•
RADIO SHACK Radio Shack Acctg. Package (Single Disk)	1800	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Triple Disk	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SIERRA NATIONAL CORP. Starbase Acctg. System	100,000	•	•	•	•	•	•	•	•			•	•	•	•
SMALL BUSINESS COMPUTER SYS. Receivables	400/disk	•				•	•	•			•	•	•	•	
SMALL BUSINESS SYSTEMS GROUP Receivables	#	•	•	ALTOS	ALTOS	•		•			•	•		•	
SOFTWARE HOWS DBI	#	•				•		•		•	•	•		•	
SOFTWARE TECHNOLOGY FOR COMPUTERS, INC. Accounts Receivable	500	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STAR COMPUTERS SYSTEMS Star System 1	#	•	•	•	•	•	•	•	•		•	•			•
STATE OF THE ART Accounts Receivable	#	•		•	•	•	•	•		•	•	•		•	•
STRUCTURED SYSTEMS GROUP Accounting Package	250 disk	•		•	•			•			•	•	•	•	•
SYSTEMS PLUS INC. Accounting Plus	65,000	•	•	•	•	•		•	•		•	•	•	•	
Accounting Plus II	1,000	•	•	•	•	•		•	•		•	•	•	•	
TARANTO & ASSOC. Accounts Receivable	#	•	•	•	•	•	•	•	•		•	•		•	•
TCS SOFTWARE, INC. TCS Total Receivables	#	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TCS Big Four	600	•						•	•		•	•	•	•	•
TINY SYSTEMS INC. Microledger Accounting Sys.	500	•		•	•	•		•		•	•	•	•		•
UNIVAIR INTERNATIONAL Univair Series 9000	99,999	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VANDATA Vandata Business Package	#	•				•	•	•				•		•	

depends on disk capacity
† unlimited



Now, Microsoft MULTIPLAN.™ toughest questions

Better tools. If you're answering "What if..." questions with a pencil, eraser, calculator and endless manhours, Multiplan gives you a better set of tools.

Fast answers. Multiplan is a software program that turns a microcomputer into an answer machine. Multiplan starts as an open "worksheet" of rows and columns. Each intersection of row and column, or "cell," in the worksheet will accept titles, names, numbers or formulas. As you assign names or values to cells, you build a worksheet for a particular problem or set of problems. You establish the logic. Multiplan assigns the time-consuming calculations to the computer. Which means you get answers. Fast.

Simpler, faster, more powerful.

Multiplan is a completely interactive electronic worksheet. Change one number or formula, and you change every number that

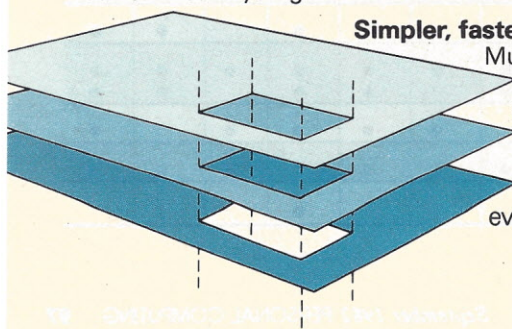
depends on it. Instantly. Furthermore, Multiplan is several worksheets deep. You can pass information from sheet to sheet automatically. A change on your cash and receivables sheet is reflected on your balance sheet, for instance.

Computing for non-computer people.

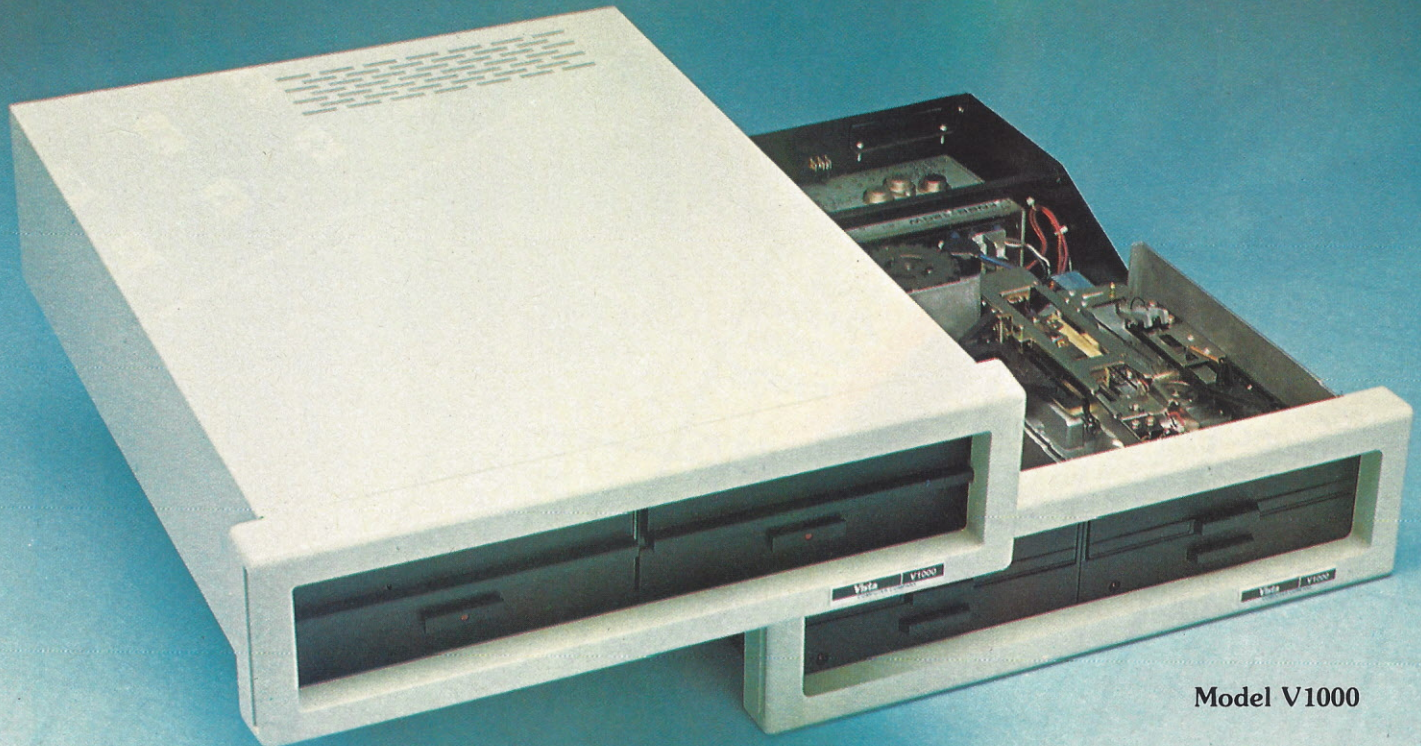
You can use Multiplan on a reasonably priced personal computer... even if you've never used a computer before. Plain English "prompts" direct you through each step. If you need additional help, just press the "?" key. Information that addresses your specific question will appear on the screen. Get your answer and return to the problem. Without leafing through a manual.

Logical problem solving. Multiplan allows you to assign English names to represent one or more cells on the worksheet. That way, you can refer to items the way you think of them. Profit equals "Sales minus Expenses" for instance. Instead of "L14 minus M17."

Watch what's happening. The computer screen displays a portion of a giant worksheet that's 63 columns wide by 255 rows deep. In addition, you can open multiple "windows" to other areas of the worksheet. That capability allows you



Vista



Model V1000

... Looking Out For You

Eight Inch Floppy Disk Drive Subsystem Model V1000

The V1000, Vista's sophisticated new disk drive subsystem, sets new standards for ease of access and use. Its innovative design permits disk drives to be mounted or removed quickly and easily for system reconfiguration or servicing.

Features:

- Deluxe chassis with internal slide allows easy access
- Storage capacity from 250 kilobytes to 2.5 megabytes

- Desk or rack mountable
- Accommodates both single-sided and double-sided drives
- Industrial quality cabinet with die cast front bezel
- Drives pull out for easy service and maintenance

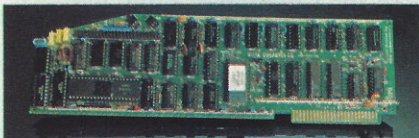
Prices:

Cabinet with (2) single-sided drives w/power supply	\$1795.00
Cabinet with (2) double-sided drives w/power supply	\$2495.00
Cabinet w/power supply	\$ 495.00

Vista's Line of High Performance, High Reliability Products also Includes these Advanced Components

MODEL A800®

Double Density 8" Controller



- Uses all standard Apple DOS commands (OPEN, CATALOG, LOCK, DELETE, LOAD, etc.) except for INIT which has been improved and enhanced in a Vista format routine
- Compatible with Apple DOS 3.3, Pascal 1.1 and CPM 2.2 (with the Z80 soft card by Microsoft)
- 2K x 8 PROM contains Autoboot functions and all eight-inch floppy driver code allowing complete compatibility with Apple DOS 3.3

Suggested price

\$545.00

EIGHT INCH SYSTEMS

Cabinet with (2) single sided drives w/power supply, A800 controller & cables \$2095.00

Cabinet with (2) double sided drives w/power supply, A800 controller & cables \$2695.00

™Z80 is a registered trademark of ZILOG™

™CP/M is a registered trademark of Digital Research

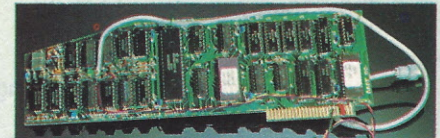
Vista Computer Company, Inc.
1317 E. Edinger Avenue
Santa Ana, CA 92705
(714) 953-0523

CIRCLE 38

Contact your local dealer.

VISION 80®

Video Display Card



- Full upper and lower case character capability with 3 dot descenders
- 9x10 dot matrix per line U.S. (9x11 Europe)
- 128 ASCII character set
- BASIC, FORTRAN and Pascal languages supported
- Z80™ and CP/M™ compatible
- Compatible with all standard Apple™ peripherals
- Source switches between 40x24 and 80x24 software and hardware

Suggested price

\$325.00

SPECIAL REPORT

"An accountant can provide you with more and better information, but it takes him about 30 days. In 30 days, you could be dead."

AS OF 05/31/79		A. CORNER GROCERY STORE MONTHLY PAYROLL REGISTER				
REFERENCE		GROSS PAY	F. I. C. A.	F. I. T.	OTHER DED.	NET PAY
EMPLOYEE # 101: MARY LANCASTER						
CD 05/04/79 407		87.00	5.26-	4.00-		77.74
CD 05/11/79 439		87.00	5.33-	4.00-		77.67
CD 05/19/79 482		87.00	5.33-	4.00-		77.67
CD 05/27/79 509		87.00	5.33-	4.00-		77.67
MONTH		348.00	21.25-	16.00-	0.00	310.75
QUARTER		1,044.00	67.55-	58.50-	0.00	917.95
YEAR-TO-DATE		2,138.60	115.95-	124.69-	0.00	1,898.06
EMPLOYEE # 102: JAMES MONTGOMERY						
CD 05/04/79 408		200.00	12.10-	14.30-		173.60
CD 05/11/79 440		200.00	12.26-	14.30-		173.44
CD 05/19/79 483		200.00	12.26-	14.30-		173.44
CD 05/27/79 510		200.00	12.26-	14.30-		173.44
MONTH		800.00	48.88-	57.20-	0.00	693.92
QUARTER		2,400.00	148.98-	154.96-	0.00	2,096.06
YEAR-TO-DATE		5,000.00	366.08-	312.26-	0.00	4,321.66
EMPLOYEE # 103: JACK RYDEN						
CD 05/06/79 411		200.00	12.10-	24.70-		163.20
CD 05/13/79 443		200.00	12.26-	24.70-		163.04
CD 05/19/79 486		200.00	12.26-	24.70-		163.04
CD 05/27/79 513		200.00	12.26-	24.70-		163.04
MONTH		800.00	48.88-	98.80-	0.00	652.32
QUARTER		2,400.00	246.48-	196.56-	0.00	1,956.96
YEAR-TO-DATE		5,000.00	567.58-	353.86-	0.00	4,078.56
EMPLOYEE # 106: WILLIAM P. HAGEN						
CD 05/19/79 485		40.60	2.49-	1.20-		36.91
MONTH		40.60	2.49-	1.20-	0.00	36.91
QUARTER		81.20	3.69-	3.69-	0.00	73.92
YEAR-TO-DATE		1,395.15	152.79-	77.55-	0.00	1,164.81

A typical monthly payroll register from BPI Systems.

BIG FOUR ACCOUNTING

(continued from page 93)

complete necessary calculations, including sales taxes.

- Provide an analysis of sales in whatever functional categories are used — and perhaps by salesman, product, customer, territory, etc.—and in comparison with a prior period or budget.
- Enter data from invoices produced

directly into the accounts receivable customer files.

- Record cash receipts activity on a daily basis to ensure that it agrees with bank deposits.
- Enter data from the cash receipts record directly into the accounts receivable customer file, and be capable of matching the cash transaction with the billing transaction.
- Provide an aged trial balance

showing a breakdown of each customer's account balance at frequent intervals.

- Provide a detailed report of accounts receivable that shows each open item in each customer's account.
- Prepare statements of customer accounts that will show the aging of the balance due and automatically add a

(continued on page 109)

SPECIAL REPORT

Accounts Payable Features

COMPANY/PACKAGE	MAINTAIN HISTORY Vendor	Customer	ONE-TIME TRANSACTION FACILITY	MANUAL CHECK WRITING	CLASSIFY VENDORS	ANALYSIS OF PURCHASING AND EXPENSES	CASH REQUIREMENT PROJECTIONS	PROVIDE AGING LIST	IS SYSTEM EXPANDABLE	NUMBER OF VENDORS TO HANDLE
ADVANCED OPERATING SYSTEMS BusiComp	•	•	•	•	•	•	•	•	•	#
ALTOS COMPUTER SYSTEMS Altos Accountant	•		•	•		•	•	•	•	#
AMERICAN BUSINESS SYSTEMS FAS	•			•		•	•	•	•	9,999
BACS	•		•	•	•	•	•	•	•	#
APPLE COMPUTER CO. The Controller	•		•	•	•		•		•	125
BPI SYSTEMS, INC. BPI Business Accounting Systems	•		•	•	•	•	•	•	•	400
BUSINESS ENHANCEMENT COMPUSERVICE BEC Accounting IV	•		•	•	•			•	•	750
CHARLES MANN & ASSOC. Job Cost Accounting	•		•	•	•	•	•	•	•	2,500
CINCOM SYSTEMS, INC. Smart	•		•	•	•	•	•	•		300-1,500
CMS SOFTWARE SYSTEMS, INC. CMS	•		•	•		•	•	•	•	2,500/disk
COMPUMAX Micropay	•	•	•	•			•	•	•	#
COMPUTER SYSTEMS DESIGN Accounts Payable	•					•	•	•	•	#
H & E COMPUTRONICS Versapayables	•	•	•	•			•	•	•	†
CONTINENTAL SOFTWARE Computer Prog. Acct.	•		•	•	•			•	•	300
CYMA CORPORATION General Business System	•	•	•	•	•	•	•	•	•	6,000/meg.
Small Business System	•	•	•	•	•	•	•	•	•	6,000/meg.
DAKIN 5 CORP. The Controller	•	•	•	•		•				125
DATA TRAIN, INC. Bookkeeper Series	•	•	•	•			•	•		†
Superchief Series	•	•	•	•	•	•	•	•	•	†
Accountant Series	•	•	•	•			•	•		†
DENVER SOFTWARE Financial Partner	•		•	•	•					75
DESIGNER SOFTWARE Palantir	•	•	•	•			•	•	•	#
DURANGO SYSTEMS SBA (Small Business Applications)	•		•	•	•	•	•	•	•	#
GPS Hardisk Accounting System	•	•		•	•	•	•	•		9,998
GRAHAM-DORIAN SOFTWARE TOPS-II	•			•				•		#
INNOVATIVE BUSINESS SOFTWARE IBS	•		•	•		•	•	•	•	#
INTER-CARE Inter-Care Accounting Package	•			•	•	•	•	•	•	9,999
INTERNATIONAL MICRO SYSTEMS IMS Fin. Software Series	•		•	•		•	•	•	•	#
LEAR DATA Tristar Business System	•	•		•	•	•		•	•	#
LIFEBOAT ASSOC. The Boss	•	•	•	•				•	•	9,000

Personal Computers

COMPANY/PACKAGE	MAINTAIN HISTORY Vendor	Customer	ONE-TIME TRANSACTION FACILITY	MANUAL CHECK WRITING	CLASSIFY VENDORS	ANALYSIS OF PURCHASING AND EXPENSES	CASH REQUIREMENT PROJECTIONS	PROVIDE AGING LIST	IS SYSTEM EXPANDABLE	NUMBER OF VENDORS TO HANDLE
MANAGEMENT ACCOUNTABILITY MAGIS	•		•	•	•			•	•	100
MICRO-ARCHITECT, INC. Integrated Acctg. Package	•	•	•			•	•	•	•	400-3,000
MICRO BUSINESS SOFTWARE, INC. MBSI	•			•	•	•	•	•	•	#
MICROCOMPUTER CONSULTANTS Accounts Payable	•		•	•		•	•	•	•	32,000
MICRO-ED General Accounting Package	•		•	•				•		#
MONROE SYSTEMS FOR BUSINESS MBMS	•	•	•	•	•	•	•	•	•	400-500+
MBMS CP/M	•	•	•	•	•	•	•	•	•	400-500+
NATIONAL SOFTWARE SYSTEMS Accounts Payable	•	•	•	•		•	•	•	•	#
NORTH STAR COMPUTERS ACCPAC	•		•	•	•	•	•	•	•	#
PEACHTREE SOFTWARE Peachpak 40	•		•	•			•	•	•	350
Peachpak 8	•		•	•			•	•	•	†
Peachpak 4	•		•	•			•	•	•	700
PRODIGY SYSTEMS, INC. Prodigy Acctg. Package	•		•	•	•	•	•	•	•	#
QUEST, INC. Quest Accounting Software	•	•	•	•	•	•	•	•	•	#
RADIO SHACK Accounting Package-Single Disk	•	•		•	•		•	•	•	500
Triple Disk	•	•	•	•	•	•	•	•	•	#
SIERRA NATIONAL CORP. Starbase Acctg. System	•	•		•	•	•	•	•	•	100,000
SMALL BUSINESS COMPUTER SYSTEMS Accounts Payable	•		•	•	•			•	•	300-
SMALL BUSINESS SYSTEMS GROUP Accounts Payable	•	•		•				•	•	#
SOFTWARE HOWS DBI	•		•	•	•			•	•	#
SOFTWARE TECHNOLOGY FOR COMPUTERS, INC. Accounts Payable	•	•	•	•	•	•	•	•	•	200
STAR COMPUTER SYSTEMS Star System 1	•			•	•	•	•	•	•	#
STATE OF THE ART Accounts Payable	•		•	•	•	•	•	•	•	#
STRUCTURED SYSTEMS GROUP Accounting Package	•	•	•	•			•	•	•	250/disk
SYSTEMS PLUS INC. Accounting Plus	•		•	•	•	•	•	•	•	65,000
Accounting Plus II	•			•	•	•	•	•	•	to 1,000
TARANTO & ASSOC. Accounts Payable	•		•	•	•	•		•	•	#
TCS SOFTWARE, INC. TCS Total Payables	•		•	•	•	•	•	•	•	#
TCS Big Four	•		•	•			•	•		600
TINY SYSTEMS INC. Microledger Accounting System	•		•	•	•	•	•	•	•	500
UNIVAIR INTERNATIONAL Univair Series 9000	•	•	•	•	•	•	•	•	•	999
VANDATA Vandata Business Package	•			•				•	•	#

SPECIAL REPORT

Payroll Features

COMPANY/PACKAGE		FEATURES									
		NUMBER OF POSSIBLE DEDUCTIONS	PROVIDE ANNUAL UPDATES	MAINTAIN ANNUAL TAX EMPLOYEE HISTORIES	SUMMARIZE INDIVIDUAL HISTORY BY CATEGORY	INCREASE EMPLOYEE EMPLOYEES	RETAIN CONSTANT PAYROLL DATA	ACCOMMODATE MULTIPLE PAY BASES	PROVIDE SUMMARY INFORMATION Monthly	Quarterly	Annually
ADVANCED OPERATING SYSTEMS BusiComp	7	•	•		•	•	•	•	•	•	
ALTOS COMPUTER SYSTEMS Altos Accountant	14	•	•	•	•	•	•	•	•	•	
AMERICAN BUSINESS SYSTEMS FAS	11	•	•	•	•	•	•	•	•	•	
BACS	11	•	•	•	•	•	•	•	•	•	
BPI SYSTEMS, INC. BPI Business Accounting Systems	9	•	•		•	•	•	•	•	•	
BUS. ENHANCEMENT COMPUSERVICE BEC Accounting IV	8	•	•	•	•	•	•	•	•	•	
CHARLES MANN & ASSOC. Job Cost Accounting	10	•	•	•	•	•	•	•	•	•	
CINCOM SYSTEMS, INC. Smart	15	•	•	•	•	•	•	•	•	•	
CMS SOFTWARE SYSTEMS, INC. CMS	10	•	•		•	•	•	•	•	•	
COMPUMAX Micropers	5	•	•		•	•	•	•	•	•	
COMPUTER PRODUCTS INT'L Pay-Ware	17	•	•		•	•	•	•	•	•	
COMPUTER SYSTEMS DESIGN Payroll	8	•	•		•	•	•		•	•	
H & E COMPUTRONICS Versapayroll	7	•	•		•	•	•	•	•	•	
CONTINENTAL SOFTWARE Computer Prog. Acct.	13	•	•		•	•	•		•	•	
CYMA CORPORATION General Business System	26	•	•	•	•	•	•	•	•	•	
Small Business System	26	•	•	•	•	•	•	•	•	•	
DATA TRAIN, INC. Bookkeeper Series	14	•	•	•	•	•	•	•	•	•	
Superchief Series	14	•	•	•	•	•	•	•	•	•	
Accountant Series	14	•	•	•	•	•	•	•	•	•	
DESIGNER SOFTWARE Palantir	12	•	•	•	•	•	•	•	•	•	
DURANGO SYSTEMS SBA (Small Business Applications)	25	•	•		•	•	•	•	•	•	
DYNACOMP Payfive	8	•	•	•	•	•	•	•	•	•	
GRAHAM-DORIAN SOFTWARE SYSTEMS, INC. TOPS-II	10		•		•	•	•		•	•	
INNOVATIVE BUSINESS SOFTWARE IBS	13	•	•	•	•	•	•	•	•	•	
INTER-CARE Inter-Care Accounting Package	13	•	•		•	•	•	•	•	•	
INTERNATIONAL MICRO SYSTEMS IMS Fin. Software Series	14	•	•	•	•	•	•	•	•	•	
LEAR DATA Tristar Business System	12	•	•		•	•	•	•	•	•	
MANAGEMENT ACCOUNTA- BILITY GROUP MAGIS	5	•	•		•	•	•		•	•	

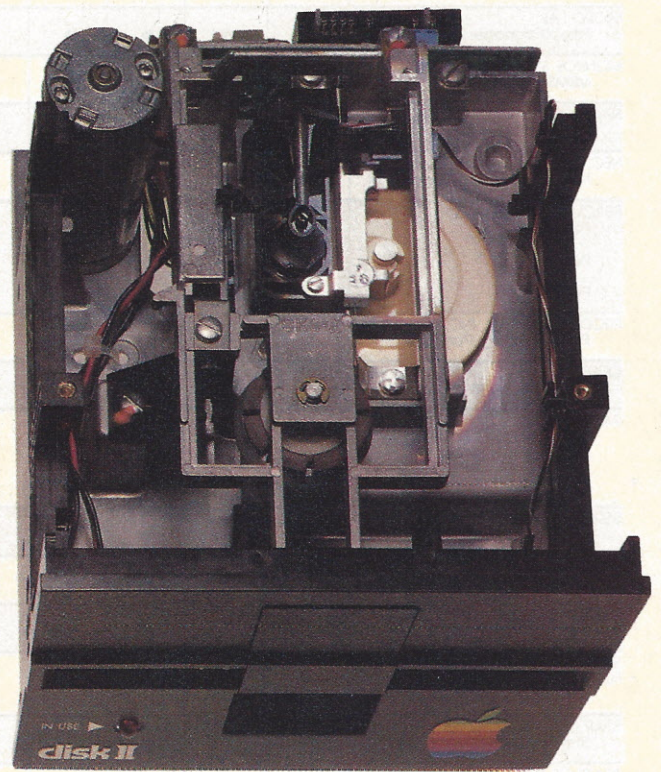
"That is the hallmark of our systems. They're written in the language of the businessman, and not in computerese."

COMPANY/PACKAGE		NUMBER OF POSSIBLE DEDUCTIONS	PROVIDE ANNUAL TAX UPDATES	MAINTAIN INDIVIDUAL EMPLOYEE HISTORIES	SUMMARIZE EMPLOYEE HISTORY BY CATEGORY	INCREASE NUMBER OF EMPLOYEES	RETAIN CONSTANT PAYROLL DATA	ACCOMMODATE MULTIPLE PAY BASES	PROVIDE SUMMARY INFORMATION Monthly	Quarterly	Annually
MICRO-ARCHITECT, INC. Integrated Acctg. Package	6	•	•		•	•	•	•	•	•	
MICRO BUSINESS SOFTWARE, INC. MBSI	#	•	•		•	•	•		•	•	
MICRO LAB Payroll Manager	15	•	•	•	•	•	•	•	•	•	
MONROE SYSTEMS FOR BUSINESS MBMS (CP/M)	16	•	•	•	•	•	•	•	•	•	
NATIONAL SOFTWARE SYSTEMS National Software	9	•	•	•	•	•	•	•	•	•	
NEC HOME ELECTRONICS USA NEC General Accounting Syst.	9	•	•		•	•	•	•	•	•	
PEACHTREE SOFTWARE Peachpak 40	6	•	•		•	•	•	•	•	•	
Peachpak 8	12	•	•	•	•	•	•	•	•	•	
Peachpak 4	6	•	•		•	•	•	•	•	•	
PRODIGY SYSTEMS, INC. Prodigy Acctg. Package	10	•	•		•	•	•		•	•	
QUEST, INC. Quest Accounting Software	12	•	•	•	•	•	•	•	•	•	
RADIO SHACK Radio Shack Accounting Package (Single Disk)	20	•	•	•	•	•	•	•	•	•	
Triple disk	20+	•	•	•	•	•	•	•	•	•	
SIERRA NATIONAL CORP. Starbase Acctg. System	19	•	•	•	•	•	•	•	•	•	
SMALL BUSINESS SYSTEMS GROUP Small Business Systems Group	#	•	•	•	•	•	•	•	•	•	
SOFTWARE HOWS DBI	7	•	•	•	•	•	•	•	•	•	
SOFTWARE TECHNOLOGY FOR COMPUTERS, INC. Advanced Payroll Package	9	•	•	•	•	•	•	•	•	•	
STAR COMPUTER SYSTEMS Star System 1	10		•		•	•	•	•	•	•	
STATE OF THE ART Payroll	10	•	•	•	•	•	•	•	•	•	
STRUCTURED SYSTEMS GROUP Accounting Package	24	•	•		•	•	•	•	•	•	
SYSTEMS PLUS INC. Accounting Plus	10	•	•		•	•	•	•	•	•	
TARANTO & ASSOC. Payroll	†	•	•	•	•	•	•	•	•	•	
TCS SOFTWARE, INC. TCS Total Payables	7	•	•	•	•	•	•	•	•	•	
TCS Big Four	7	•	•	•	•	•	•	•	•	•	
TINY SYSTEMS INC. Microledger Accounting System	8	•	•		•	•	•	•	•	•	
UNIVAIR INTERNATIONAL Univair Series 9000	10	•	•	•	•	•	•	•	•	•	
VANDATA Vandata Business Package	†	•	•		•	•	•	•	•	•	

We thank the following for their contributions of time and expertise: Donald A. Harder, manager, Ernst & Whinney, New York, N.Y.; Robert F. Kelleher, principal, Arthur Young & Co., New York, N.Y.; Richard F. Lane, partner, Scheinich & Lane, CPAs, Paramus, N.J.; Paul H. Rich, partner, Siegel & Mendlowitz, New York, N.Y.; and Robert J. Zink, management consultant, Man Hurdman, Roseland, N.J.

limited only by disk capacity
† unlimited

When you say your disk drive has more juice than Apple's, be prepared to cut one open.

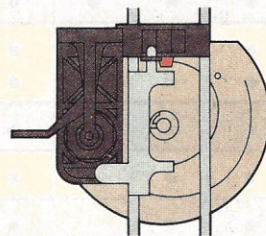


The problem with Apple's disk drive stems from the core.

There are a lot of good reasons why dealers all over America aren't recommending Apple's disk drive. And one of the main reasons is Rana Systems' new Elite Series of Apple II compatible disk drives.

It's easy to see why Apple® has been having some major slipped disk problems. Just look at their antiquated head positioner.

It's plastic. Just like a toy. That's why it can take multiple passes to get the information needed. And why the information on your disk can appear obscured and unreadable. If Apple's positioner doesn't accurately center the head over your data tracks, it's no bargain at any price.



Apple's primitive plastic positioner. A workable, but sloppy, way to capture data.

Rana knows the head positioner is the heart of the machine, so we didn't cut any corners. To most accurately place the head over the data area we use finely machined lead screws and metal band positioners. They provide you with the fastest and clearest data recognition on the market. With three to four times faster

Rana's state of the art technology lead screw and metal band positioners give vastly improved speed and accuracy.

access, track to track. With far greater precision than Apple's, to give you virtually 100% data integrity.

More juice on Apple's inferiority.

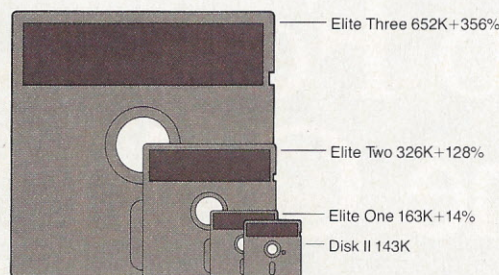
There's another big problem Apple has chosen to ignore. The irritating scratching noise that occurs when it is searching for information. Rana, on the other hand, has built the Elite Series to be virtually noiseless.

And more importantly, Rana has an advanced write protect feature which makes it impossible to lose your information. A simple touch on the front panel's membrane switch gives you failsafe control. Apple of course only has a notch or tab, which gives you only minimal protection.

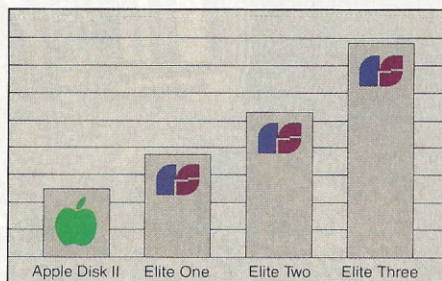
With the superior Elite controller card, you can control up to four floppy disks using only one slot. With Apple's you can only use two. Of course, you can still plug into Apple's controller card, but down the line you'll want to switch to Rana's and save yourself a slot.

Elite also gives you more byte per buck.

Even our most economical model, the Elite One, gives you 14% more storage than Apple's. 163K versus Apple's 143K. With our Elite Two offering 326K and our top-of-the-line Elite Three offering a 356% storage increase at 652K. That's almost comparable to hard disk performance, all because of our high density single and double sided disks and heads.



And the cost? Just look at the chart. 272 Bytes per dollar for Apple, versus between 363 to 767 Bytes per dollar for ours. They're not even close.



The real beauty of it isn't the beauty of it.

There is no comparison to the lean, clean design of the Elite Series to Apple's 5 year old model (which by the way has never been updated). It's our superior technology, operating economy, increased storage and faster step that makes us the best performing and hottest selling disk drive in America.

So give us a call or write for more information. It doesn't take a lot of courage to cut into an Apple when you outshine them as brilliantly as we do.

RanaSystems



20620 South Leapwood Avenue, Carson, CA 90746 213-538-2353. For dealer information call toll free: 1-800-421-2207. In California only call: 1-800-262-1221. Source Number: TCT-654

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SPECIAL REPORT

BIG FOUR ACCOUNTING

(continued from page 101)

finance charge for overdue balances.

- Provide an audit report of all adjustments to receivable balances that are not entries from cash receipts.
- Provide an audit report on all customers who have reached their credit limit.
- Provide listings of individual transactions from each input source for each monthly period.
- Be integrated with general ledger.

The Prodigal Son

Far from being the "lifeblood" of a business, accounts payable, on the other hand, is sometimes called the Prodigal Son of accounting software. Few businessmen even recognize their need for accounts payable until it comes forcefully through the door, demanding their attention. But it is, like the Prodigal Son, a most valuable addition to your computer software family.

Most small businesses have no idea where their money goes each month, and certainly not where the money must go next month or the month after. For that reason, they cannot and do not plan their payments, and they often fail to take advantage of substantial discounts which could save them hundreds, if not thousands a year. Often, they end up taking out short-term loans and paying high interest rates, which they might have avoided with smarter planning of payables. A good accounts payable package, therefore, should:

- Provide an analysis of purchasing and expense activity by function, department or profit center, and by inventory classifications, if required.
 - Provide an historical record of purchases by vendor and by product code for materials.
 - Provide an open item listing that can be used to indicate those invoices that are to be paid, and to take advantage of discounts available.
 - Provide a cash requirement pro-
- (continued on page 112)

COMING NEXT MONTH

Cranking Up For Winter

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CIRCLE 67

The Panasonic portable computer We've improved the way



The Link™ by Panasonic.

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Software Solutions — Now there's an exciting new software system for the 6502 microprocessor that gives you more solutions to your problems.

The popular language software for the portable computer includes Extended Basic Compiler/Interpreter, SnapFORTH and Microsoft Basic.®

The Panasonic portable computer also has a wide range of specific software programs for your specific problems, such as:

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Portabudget — It's your portable personal financial manager. It gives you up-to-the-minute personal control. It allows you to be your own record keeper, savings advisor, accountant, bill manager, credit and charge account guide, investment counselor, portfolio keeper, and tax assistant. Overall, it helps plan your personal financial life, portably.

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with a wide range of new software. you solve problems.

Portaflex — A master program that allows you to create solutions for applications, such as:

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- ☐ *Field Service* — Retrieve, diagnose, and analyze your field service data wherever you are in the field.
- ☐ *Auditing and Accounting* — Custom auditing and accounting, anywhere you are in the field.
- ☐ *Estimating* — Versatility for flexible bidding and estimating at your job site.

Software Development Tools for the Customizer — Create your own custom programs and burn them into your EPROM so your program is recorded in nonvolatile form.

Simply take a desk top microcomputer*, insert the software development discs, create your own program, de-bug that program, compile the program, then "burn-in" your problem-solving EPROM.

*Presently offered for Apple II Plus.

Hardware Specifications —

The Panasonic portable computer offers 6502 microprocessor (1 MHz) technology.

- ☐ It offers 4K or 8K internal nonvolatile RAM
- ☐ 48K internal ROM
- ☐ Built-in Ni-Cad rechargeable battery pack
- ☐ External AC adapter/recharger
- ☐ 26-character liquid crystal display
- ☐ 65-key completely redefinable keyboard

Introducing Peripherals for Additional Solutions —

Modular peripherals let you customize your system.

- ☐ Multiple RS-232C serial interfaces
- ☐ Asynchronous modem with cassette interface (110 or 300 baud)
- ☐ 40-character microprinter (thermal dot matrix printing)
- ☐ 8K or 16K RAM memory expansion packs
- ☐ X-Y, four-color plotter (up to 80 characters per line)
- ☐ TV adapter (32 characters X 16 lines with color and graphics)

The Panasonic portable computer. It's improved the way you solve problems. Because we believe its portable modules and multiple software applications can vastly improve your productivity. And that can be an important solution to your profit problems.

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SPECIAL REPORT

Run date: 17-Sep-81			Great Plains Software			Page 1		
ACCOUNTS PAYABLE CHECK REGISTER								
---CHECK---		-----VENDOR-----		VOUCHER		-----INVOICE----		INVOICE DISC/REFUND CHECK/CREDIT
#	DATE	#	NAME	#	#	DATE	AMT PAID	AMOUNT
3849	9/17/81	600	International Digital	134	9938	9/17/81	100.00	2.50
8491	9/17/81	630	Mandey's Corp	132	STMNT	9/17/81	250.00	.00
884	9/17/81	720	Computer Industries Inc.	129	88431	9/17/81	85.00	3.00
3 PREPAID CHECKS				PREPAID TOTALS:			435.00	5.50
								429.50
7748	9/16/81	150	Associated Marketing Inc.	126	MM 5506	9/16/81	95.00	
4425	9/16/81	170	ACME Publications, Inc.	124	2351	9/16/81	72.50	
2 PARTIAL PAYMENTS				PARTIAL TOTALS:			167.50	.00
								167.50
5500	9/17/81	120	RET Systems, Inc.	137	8449	9/17/81	1,000.00	.00
5501	9/17/81	140	Great Technology	127	HT 995	9/16/81	200.00	3.90
5502	9/17/81	150	Associated Marketing Inc.	126	MM 5506	9/16/81	5.00	5.00
				131	99433	9/17/81	250.00	4.85
				CHECK TOTAL:			255.00	4.85
5503	9/17/81	170	ACME Publications, Inc.	124	2351	9/16/81	2.50	
5504	9/17/81	180	Ace Paper Co	123	9930	9/16/81	150.00	2.80
5505	9/17/81	200	Disk Data Inc	122	ST 9022	9/16/81	250.00	4.60
5506	9/17/81	580	Eli Graphic	128	VG 59902	9/17/81	2,500.00	48.50
7 COMPUTER CHECKS				COMPUTER TOTALS:			4,357.50	64.65
								4,292.85
12 TOTAL CHECKS				TOTAL ALL CHECKS:			4,960.00	70.15
								4,889.85

A printout from an accounts payable register available from Great Plains Software.

BIG FOUR ACCOUNTING

(continued from page 109)

jection based on the due date for items in accounts payable.

- Be integrated with the cash disbursements system so that when an invoice is paid, it is automatically eliminated from the accounts payable file.
- Provide detailed listings of all purchasing, expense and cash disbursement activity for each month.
- Be capable of handling data for all

present and anticipated vendors for whom records will be maintained.

- Provide security over the addition of unauthorized vendors and an audit report showing the names of all vendors added.
- Provide an aged listing of accounts payable by vendor.
- Be integrated with the general ledger system.

In accounts payable as in virtually every other computerized accounting
(continued on page 146)

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Mission Computers
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Palo Alto, CA 94301
415-326-9689

Computerland of Concord
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Concord, CA 94520
415-827-4985

Home & Business
Computer Center
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Valley Plaza Center
Pleasanton, CA 94566
415-846-3944

The Computer Store of Oakland
1320 Webster St.
Oakland, CA 94612
415-763-7900

Executron Systems, Inc.
299 N. McDowell Blvd.
Petaluma, CA 94952
707-778-1242

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San Jose, CA 95129
408-973-0111

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Schaumburg, IL 60195
312-397-8700

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FURNITURE FOR ELECTRONICS

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The arts and sciences have finally combined to produce a "home" for your computer system. The ELECTRONITURE™ computer desk—and matching printer stand—are made of solid oak (a welcome choice in this age of metal shelving and particle board carpentry). Attention to detail is obvious in the gently rounded edges, the precision hardware, the convenient hideaway work surface that slides out above the keyboard, the invisible West German couplings that give the assembled unit rock-solid stability, and the satin smooth hand rubbed oil finish.

The best of two disciplines

The design of the desk is a triumph of both form and function. As furniture, it is a handsome addition to home or office—with classic lines that complement any room, any decor. As a functional computer work area, it brings order and efficiency to the system, comfort and convenience to the user.

Because the desk strictly adheres to the principles of Humanscale™ (the most sophisticated and thoroughly documented design parameters available for meeting

the physical needs and capacities of human beings), you will find that your keyboard, monitor, and disk drives are always at the most comfortable operating distance and within the same focal range. Everything falls "naturally to hand"—thanks to science, not trial and error.

Overall dimensions are surprisingly modest: 50" high, 44" wide, 29½" deep (printer stand is 25½" high, 24" wide, 19" deep). Yet because the ELECTRONITURE™ desk is designed from the ground up for

technological applications, it easily accommodates modular type computers such as Apple II or III, IBM P/C, Atari 400 or 800, and their peripherals. The monitor cabinet handles monitors up to 15½" high, 30" wide, 16" deep. Disk drives and software can be placed in the cabinet beside the monitor. Most 80-column dot matrix printers can fit next to the computer, while larger printers can be accommodated on the printer stand.

The optics, alone, make the desk well worth the investment.

The oak door in front of the monitor is inset with non-glare glass originally developed for NASA. This glass has anti-reflectant coatings and a neutral density filter. The anti-reflective coatings minimize the eye fatigue associated with trying to focus on your monitor's display through ambient reflections. The neutral density

filter maximizes character definition and enhances color displays—without distorting the image or the colors. The coatings are unaffected by temperature or humidity and are virtually abrasion proof.

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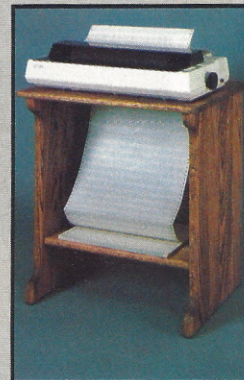
We're so certain that you'll be pleased with your ELECTRONITURE™ that we'll gladly refund the entire purchase price if you're dissatisfied for any reason. And if you have any questions not answered in this advertisement, please phone us any weekday between 9 a.m. and 5 p.m. PT, at 707-526-1074.

The computer desk is \$895, the printer stand is \$225, and we have an optional paper bale for the stand at \$25. California residents please add 6% sales tax. All prices include shipping in the continental U.S. The desk is shipped unassembled—assembly takes about 20 minutes—and the only tool needed is a screwdriver.

Why not place your order today. Even the most powerful computer system can be vastly improved by the logical organization and operating comfort of ELECTRONITURE™.

To order write or call: The Bench Collection, 1387-D Cass Rd., Santa Rosa, California 95401, 707-526-1074. VISA, MasterCard, check and money order are welcome.

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Now TeleVideo has entered the even more competitive microcomputer marketplace. And we intend to repeat that success with the same basic philosophy:

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For a price lower than many of the low performance personal computers.

TELEVIDEO'S TS 802 AND TS 802H. THE COMPUTERS THAT GIVE YOU MORE.

The TS 802 is TeleVideo's lowest priced computer.

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- An upward growth path through a unique multiple processor, building block architecture.
- Dual 5¼ inch double density diskettes with a million bytes of unformatted storage capacity.
- A high resolution, non-glare video screen with detached keyboard — just two examples of our innovative, ergonomic computer design.

- Two R232C serial ports for a printer and modem.

• And a high speed port for plug-in expansion to a larger multi-user, multi-tasking TeleVideo computer system.

• But suppose you need more storage. TeleVideo's next model up, the TS 802H, gives you all the same features of the TS 802. But instead of two floppy diskettes, it uses one floppy diskette and a 5¼-inch Winchester hard disk to give you 9.6 million bytes of unformatted storage capacity — nearly 10 times the storage for only twice the price of the TS 802.

COMPUTERS THAT GROW AS YOUR NEEDS GROW.

The TS 802 and TS 802H are more than just single-user, stand alone computers.

When it's time to expand, simply plug them into TeleVideo's more powerful TS 806 or TS 816 multi-user, multi-tasking systems. The TS 802s then become intelligent, fast response satellite stations.

And because each has its own CPU, there's none of the degradation of throughput and contention for a single CPU that slows down the typical shared system. Each user maintains full processing capability in a shared file environment.

With TeleVideo, there's no obsolescence. Because of the unique multi-CPU architecture and TeleVideo's multi-tasking software, the TS 802s do not have to be replaced as your data processing needs grow.

TELESOLUTIONS. THE SOFTWARE PACKAGE THAT GIVES YOU MORE.

Instead of offering you just a business microcomputer, TeleVideo is offering a computer and software package called TeleSolutions. And instead of offering you just any software, TeleSolutions™

offers you the most popular, most versatile software: MicroPro's® word processing WordStar™ and business planning CalcStar™.

Whether you own a small

business, manage a department in a company, or are your organization's DP manager, the combination of TeleVideo com-

puters with WordStar and CalcStar gives you the quality text editing and financial planning help you'll need. If you do require more software, our CP/M operating system allows you to choose from the widest variety of microprocessor software.

When you buy either the TS 802 at \$3,495* or TS 802H at \$5,995*, TeleVideo includes WordStar and CalcStar for a special price of \$500 — a savings of nearly \$300.

WORLDWIDE SERVICE.

TeleVideo's small business computers are serviced by TRW's nationwide service network, and by distributors around the world.

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Before you begin evaluating business computers make a list of what you'd like one to do for you. Then bring that list to one of TeleVideo's computer dealers throughout the world. Sit down at a TeleVideo® computer. Study the TeleSolutions Package. Even try another computer. Compare the features, the functions, and the performance.

And compare the price.

We don't think you'll find a better business solution than TeleVideo and TeleSolutions.

For details and the address of your local distributor call toll free 800-538-1780. And in California call 415-745-7760.



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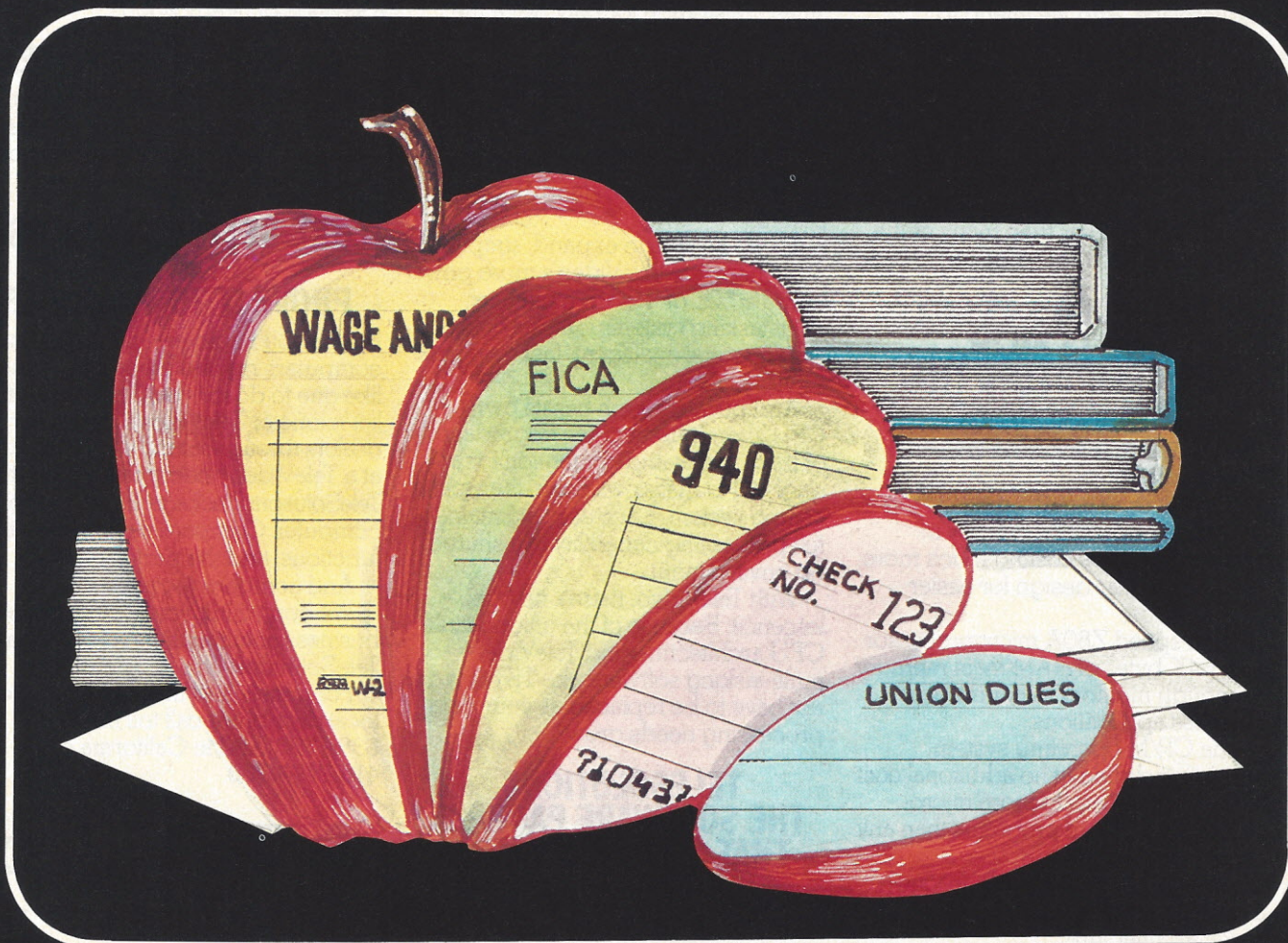
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Breaking Out Of The Payroll Bind

Many small businesses are eliminating mounds of paperwork and armies of bookkeepers—and are still delivering their checks on time—with quick and efficient payroll software

by Edgar Coudal

For years, a trusted payroll clerk had handled all in-house payroll matters at the Citizen's Bank of Morehead, Ky., and then he was promoted to a new job.

The bank's executive vice president, Robert D. Neff, was suddenly faced with the prospect of hiring a new person, restructuring existing work assignments or, perhaps, sending the payroll out to an accounting service. But in the end, he did none of these. Instead, he got himself a personal computer equipped with a payroll program that now handles, almost automatically, all payroll functions involving the bank's 26 hourly and salaried employees.

"We talked to friends at the Bank of Louisville who were familiar with small computers and programs," Neff says, "then we saw the 'Appl Pay' program running on an Apple II personal computer at a state banking convention. We had a full demonstration here in the bank and acquired the whole package on a lease-type arrangement with the Bank of Louisville."

Citizen's Bank pays each of its employees every two weeks. "The computer program," Neff says, "presumes that all hourly employees work 80 hours during those two weeks, and computes their deduc-

tions and net pay accordingly. If they work more or fewer hours, we have to put in that information manually, and the machine then will use those actual hours for its computations. It automatically computes time-and-a-half for overtime, though we haven't seen much of that in this economy."

Similar exceptions for salaried employees—bonuses, special commissions, withholding tax adjustments and so on—can be put in from the keyboard. In the most general

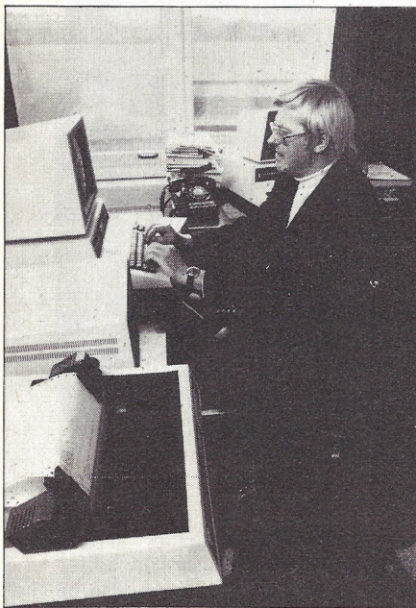
sense, this is known as a "manual override" of the software program.

Two general types

The software that Neff uses is the simpler of two general types of payroll programs. His is a stand-alone program that's concerned only with payroll matters—including the actual printing of checks and their explanatory stubs, the accumulation of all data on a quarterly and yearly basis, and finally the preparation of an inevitable W2 statement.

The second general type of payroll program is one that is part of an interactive business and financial package that also includes general ledger and perhaps receivables, payables, job-costing and inventory programs. The bewildering variety and number of such programs is shown by the fact that Data Sources distributes more than 600 of them for virtually all types of personal computers.

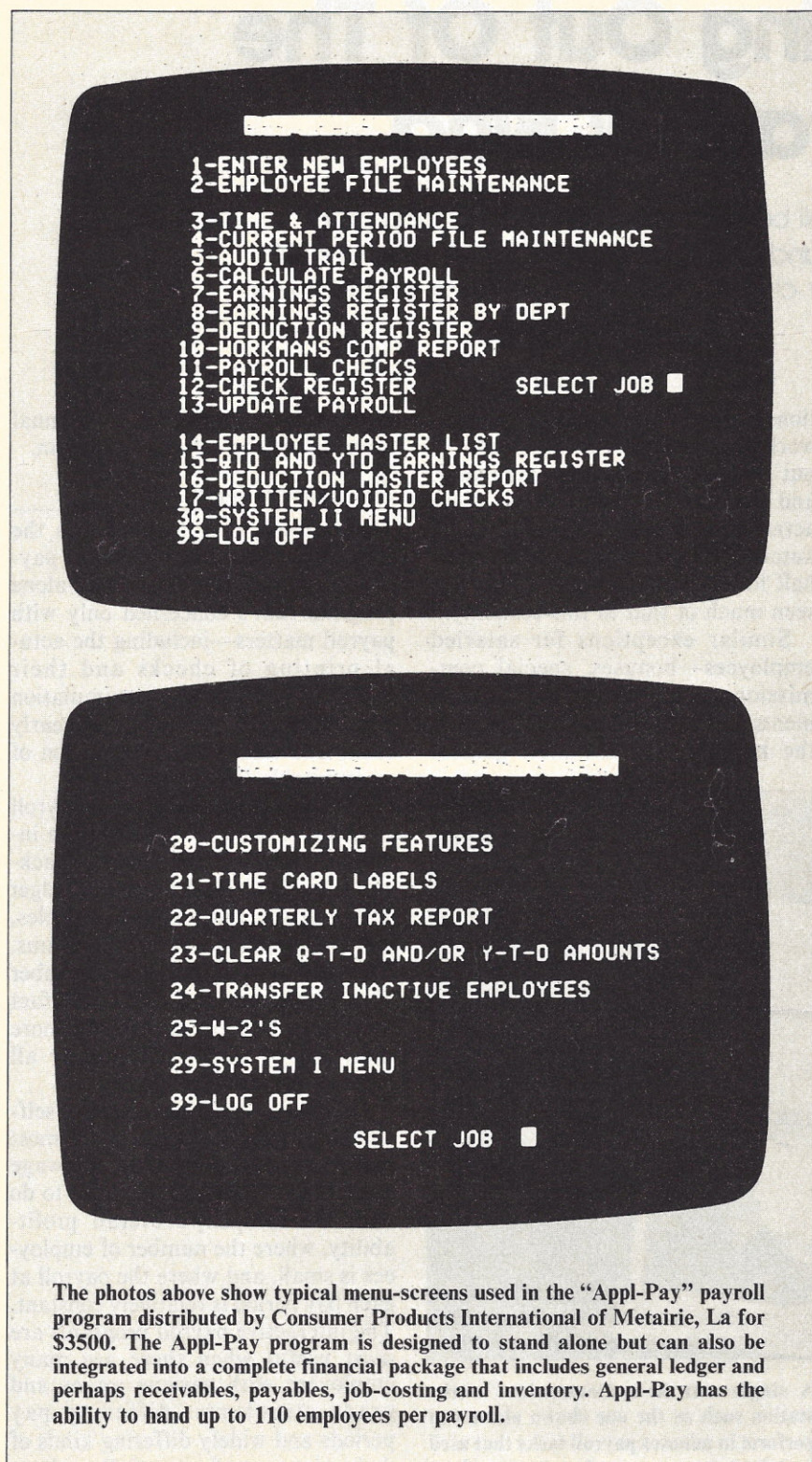
Generally speaking, limited self-contained payroll programs are most useful in applications where the wage structure is fixed and has little to do with the company's overall profitability, where the number of employees is small, and where the payroll at each pay period is relatively constant. The interactive payroll programs are most useful when there are many employees with various wages and grade structures, differing pay periods and widely differing kinds of deductions—and especially where



A single man at a Commodore workstation such as the one shown above can perform in minutes payroll tasks that used to take hours or even days to complete.

Edgar Coudal is a Chicago-based consultant who writes frequently about computers in business.

"The importance of shopping and good long-range planning is at the heart of every good payroll software installation."



The photos above show typical menu-screens used in the "Appl-Pay" payroll program distributed by Consumer Products International of Metairie, La for \$3500. The Appl-Pay program is designed to stand alone but can also be integrated into a complete financial package that includes general ledger and perhaps receivables, payables, job-costing and inventory. Appl-Pay has the ability to hand up to 110 employees per payroll.

the company's overall financial health is directly related to labor hours and job cost assignment, as in construction and production-line types of businesses.

The overall simplicity of stand-alone payroll software is reflected in its cost, which may be less than \$100 and is rarely more than \$500. For example, Appl Pay, which is published by Computer Products International of Metairie, La., retails for about \$350. There is a charge of about \$50 for yearly updates reflecting changes in tax rates and formulas. Updates may be trivial in applications such as word processing, but they are vital to payroll programs. Also fairly typical of limited stand-alone systems is Appl Pay's ability to handle up to 110 employees per payroll.

The cost of complete, interactive business and financial packages for personal computers can range well above \$1000, although some cost less than that.

Another obvious difference between the two is that limited stand-alone programs will not do all the things that bigger packages can do. "We can specify up to 10 different types of deductions, but no more," Neff says. "That's fine for us, but perhaps it wouldn't be for someone else. Also, we are faced with a city and county income tax, in addition to state and federal. The Appl Pay program keeps track of state and federal withholding on a total and individual basis, but it lumps the city and county together and later we have to compute those manually."

Simple as 1, 2, 3

Whether it's an integrated or stand-alone program, though, simplicity of use is the key to any good payroll software, according to Dr. Fred Balding, systems analyst and chief programmer for Solid State Thinking of Bend, Ore., and the author of a highly regarded integrated business program designed for

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Seems like every time you turn around, somebody comes along with a new computer for home or business use. And what's made it all possible is the amazing microprocessor, the tiny little chip that's a computer in itself.

Using this new technology, the industry is offering compact, affordable computers that handle things like payrolls, billing, inventory, and other jobs for businesses of every size...perform household functions including budgeting, environmental systems control, indexing recipes. And thousands of hobbyists are already owners, experimenting and developing their own programs.

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This is only one of the growth factors influencing the increasing opportunities for qualified computer technicians. The U.S. Department of Labor projects over a 100% increase in job openings for the decade through 1985. Most of them *new* jobs created by the expanding world of the computer.

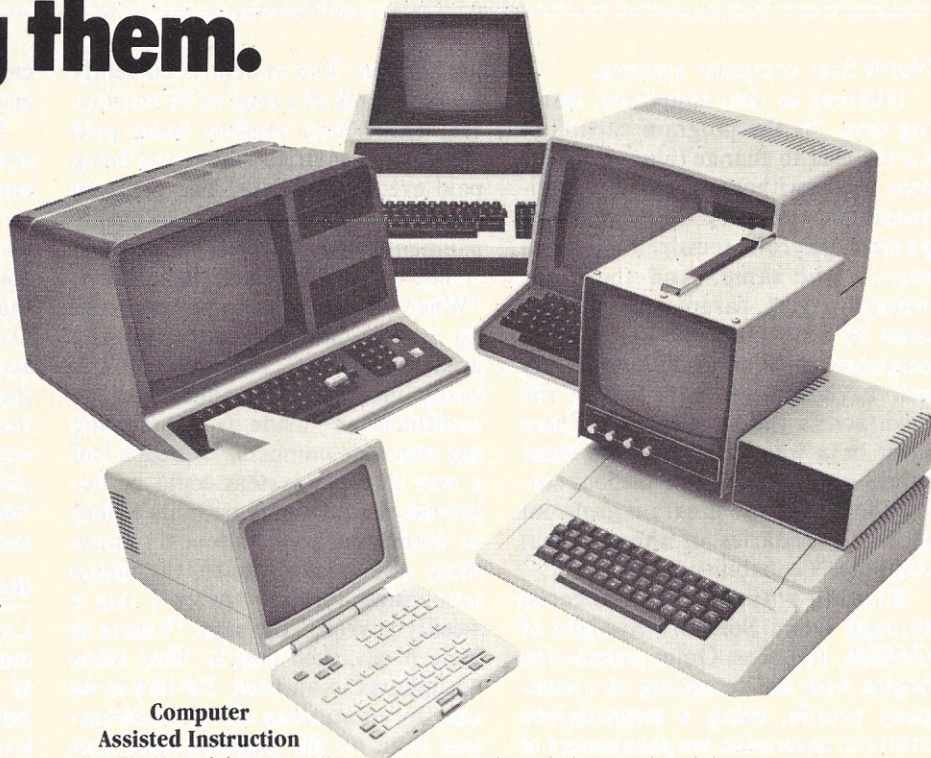
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NRI can train you for this exciting, rewarding field. Train you at home to service not only microcomputers, but word processors and data terminals, too. Train you at your convenience, with clearly written "bite-size" lessons that you do evenings or weekends, without going to classes or quitting your present job.

Your training is built around the latest model of the world's most popular computer. It's the amazing TRS-80™ Model III, with capabilities and features to perform a host of personal and business functions. No other small computer has so much software available for it, no other is used and relied on by so many people. And it's yours to keep for personal or business use.

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(TRS-80 is a trademark of the Radio Shack division of Tandy Corp.)



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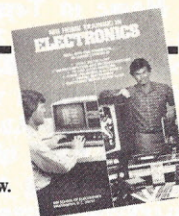
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North Star computer systems.

Inherent in that simplicity, Balding says, "is the program capability for the user to change things to fit his own needs without being an experienced programmer. No two companies' payroll requirements are exactly the same. And there are widely varying parameters of what must be done under the law, even in neighboring communities. One city will have a rapid transit levy; the town across the street won't. There must be a way to incorporate those things into the program without seeing the size of the program grow out of the boundaries of the personal computer's capability."

Balding's system is marketed through Omni Software Systems of Griffith, Ind. The Omni installation begins with the compiling of a company profile, using a menu-driven utility to determine the parameters of the company—number of employees, deductions that must be made and so on—and then incorporates that file into the program itself. Yearly changes such as those necessitated by tax law revisions may be figured by merely updating the company profile.

Save time, prevent mistakes

Such "ease of use" is evident at the Tutor Nursing Home in Temple, Texas. There a Commodore 8032 personal computer with 48k of memory, running a program marketed by BPI Systems of Austin, Texas, is used to keep track of the facility's payroll. According to Jo Beach, administrative secretary charged with day-to-day operation of the system, the hardware/software combination was installed to "save time, prevent mistakes and maintain total records... and it's done all that. It's so easy to use that everyone in management learned to run it in a very short time."

The BPI payroll system can stand alone or be interfaced with other major parts of BPI financial packages, as is being done in the Tutor

installation. The system is currently keeping track of a total of 46 employees, with hourly workers being paid weekly and salaried employees being paid every two weeks. The program also has a third option—monthly payment—should it ever be needed.

The manual "is fine," Beach says. "When all our guesses are wrong, we go to the manual and find the answers there." The system was easily installed, she adds, with no modifications "aside from entering our own code numbers." If Beach had a way that her system could be improved, it would only be in its ability to interface simultaneously more than one payroll with the main accounting system. "After I run a weekly payroll," she says, "I have to close it out, then post it. That takes 45 minutes to an hour. I'd like to be able to accumulate all the information from all the payrolls, then post all the data at the same time at my convenience."

Get the bugs out

Sometimes things can go wrong, though, as illustrated by the situation at Western Engineering, a surveying and civil engineering firm in Logan, Utah. "The real problem," says Western office manager Elaina Leeds, "is that the system does not do what I want it to." The hardware/software configuration was installed more than a year ago, Leeds adds, and "the bugs should have been out of it by now." But they're not.

"The payroll system cannot be integrated with our time and billing system, which is from a different publisher," she says. "Even though both packages run on our North Star Horizon computer, the packages are not compatible with each other. That makes for double and sometimes triple work. You can't override some important things in the payroll package on a one-time basis. The deductions now in the program are federal and state withholding tax, FICA, insurance and a miscellaneous

category, plus one more. That's not enough, nor is it specific enough."

Leeds also encountered a problem trying to print W2 forms for her 47 employees because the federal W2 form itself changed physically between 1981 and 1982, and she never got a program update. As a result, that part of the program became useless. Still another problem, according to Leeds, was that when she attempted to run the new W2s, her master file was automatically wiped out. "I'd expect the totals to be cleared automatically," she says, "but not the names and addresses. It took a while to set up the file again."

Bought "down the street"

Leeds seems to have assumed a stand-alone system could do the work of an integrated system. The problems she cites—or more accurately, her failure to achieve optimum results—probably could have been avoided with more careful planning, including the purchase of compatible packages from the same publisher.

By contrast, the McClary Construction Co. of Napa, Calif., avoided those very same problems by using totally compatible software from the same publisher, selecting a publisher nearby, and being willing to ask for help from that publisher.

Yearly updates are no problem for Jeanne Howard, who describes her job as McClary's "payroll/everything." She just "runs down the street" to Lear Data Inc., where her company purchased a payroll program that runs on a Cromemco System 3 personal computer with two 8-inch drives and 64k of memory. McClary's payroll varies from about 30 hourly and salaried employees on up, depending on the number of jobs underway.

"The Lear program does everything in two hours that would take me all week to complete manually," says Howard. "The program writes checks and prepares tax forms. There is no top limit to the number of deductions

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you can specify, or how those deductions are applied to each employee. For the archives and permanent records, the program generates totals and subtotals by week, month, quarter and year. It's all tied into the general ledger program. I can maintain as many open payrolls as I want, then post them all at once, which saves a lot of time."

While McClary has used its computer only for finance and accounting at this point, Lear Data is developing a cost-estimating program to be integrated into the other software, and this will be a powerful tool in McClary's framing construction business.

Amusement park payroll

A variation on the payroll theme is the use of similar programs by accountants to handle the payrolls of client companies. One such user is Ode W. Meaders, president of Mesquite Bookkeeping Services of Mesquite, Texas, who installed the BPI payroll system and was able to reduce his staff "from six people to three, while doing the same amount of work faster and more accurately."

In addition to a normal accountancy practice, Meaders handles pure payroll functions for eight different firms, including such diverse companies as an amusement park and a masonry contractor. From those firms, Meaders receives weekly time cards and completes all payroll functions, ranging from the printing of individual checks to the filing of necessary tax reports. In addition, seven more clients compute their own weekly payrolls, then turn over the information to Meaders for integration into the companies' general ledgers. Both types of clients are handled on a Commodore 8032 computer with two disk drives, and both use exactly the same software.

"One of the nice things about it is the ability to specify different types of allowances for different companies," Meaders says. "You run into



"Make sure the program runs. That sounds idiot-simple, but a lot of people overlook it."

unusual items like uniform allowances and car expenses that not all companies need. We can specify those kinds of things whenever it's necessary."

The program is resident in one drive; a separate disk containing data for each of the companies is placed in the second drive when that particular company's records are updated. While more than one company's records could be contained on a single disk, Meaders prefers the security of separate disks for each of his clients. This is a common method of handling payroll matters on personal computers.

Meaders installed the system in December 1981 after deciding exactly what he wanted to do with it, looking at a number of systems, and having three brought into his office for demonstrations. "We liked the Commodore/BPI combination best," he says. "There were a few problems at first. People from the computer store came out, gave us a few hours of instruction and then left us on our own. We had to kind of feel our way for a couple of months; anyone installing a computer system for the first time should expect to do that."

At the heart of it

The importance of shopping and good long-range planning before installation, such as pursued by Meaders, is at the heart of the matter, according to representatives of two "systems houses," a loose definition that includes consultants and those who specify and sometimes even design hardware and/or software.

Anthony Nicotra of Miami, who describes his Microtrol company as a "hardware/software engineering" specialist, says: "The important thing is to 'size' a company's requirements first. Just what do they need? How much power? How much data will be used? Only then can you begin to match up hardware and software to the requirements. You have to learn a lot about a company before you

can even begin to think about specific computer components and programs."

Another systems consultant, John D. Halamka of Napa, Calif., whose firm, Colossus Hardware/Software, employs 15 people and uses products from 26 different publishers and manufacturers, adds that one of the most important aspects of a user's interaction with a payroll system is in its documentation. "The best software in the world is useless," he says, "if the manuals don't tell you how to employ it properly."

On the matter of documentation—the print material that accompanies a diskette—Gabe Rincon of The Computer Place in New Orleans says the clear and easy-to-follow manual that accompanied Appl Pay was a major factor in the store's decision to stock the CPI product. "The manual shows you pictures of what the screen should be displaying," Rincon says. "It teaches you to use the program by actually taking you through it step by step."

"Documentation should provide users with answers, not puzzles," notes Halamka of Colossus. He also has a few tips for spotting high-quality, high-performance payroll programs:

"A buyer should ask if the program will handle deductions for different states," he says, "A Chicago area employer might have people from Illinois, Indiana and Wisconsin on his payroll, with different taxes to pay for each of those states. Good programs will be able to cope with those situations. Inferior programs won't. Another thing to look for is if the program runs. That sounds idiot-simple, but a lot of people overlook it. A program may be very difficult to install.

"Another key point is the size of the data files. Most publishers will furnish tables on the maximum amount of data that a program can store and access. Finally, a prospective buyer should find users who have

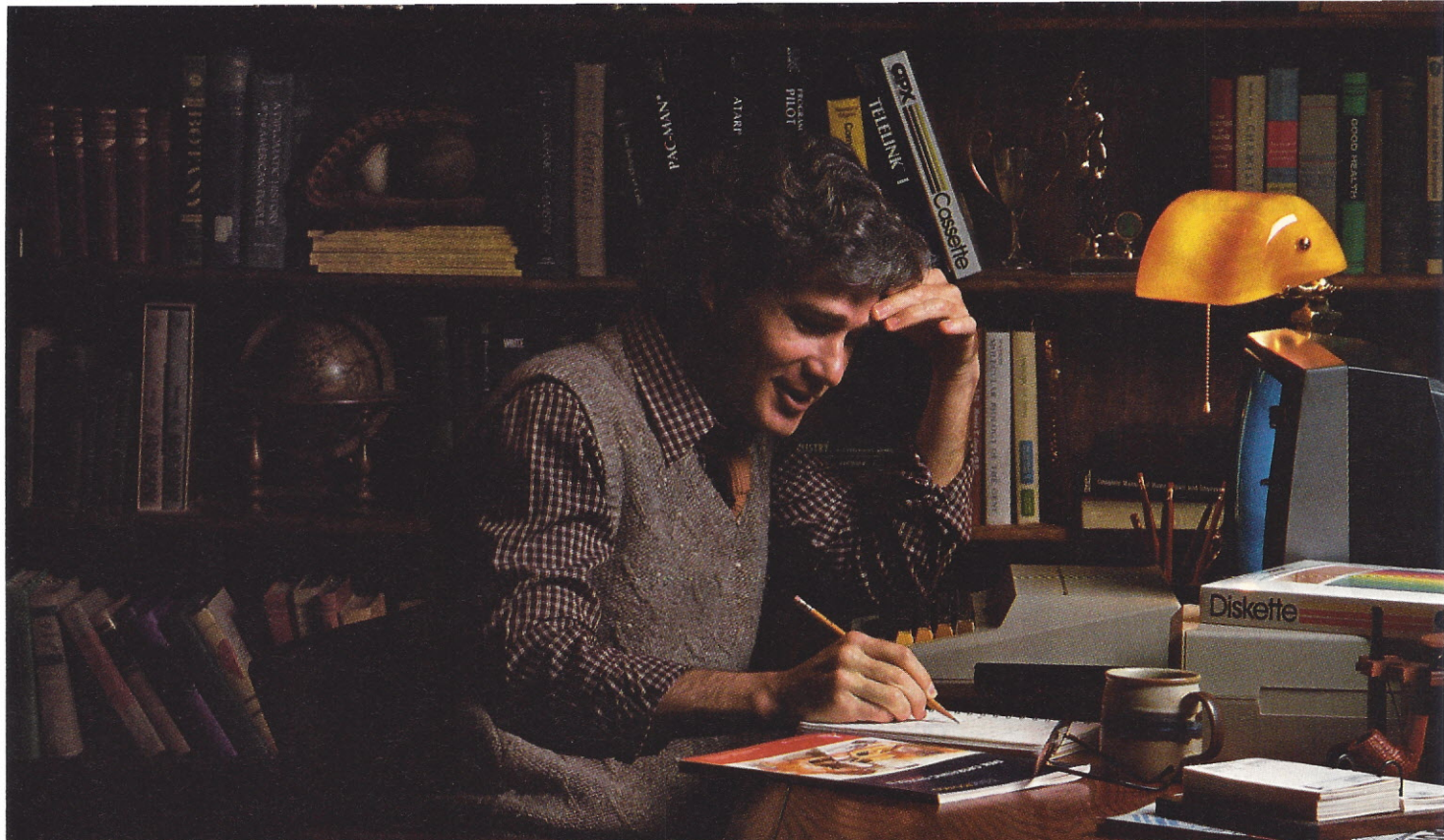
experience with the specific program being considered and talk to them, then get a demo model and hands-on experience before committing any money. It all comes down to a user's specific needs. What may be a rotten program for one company may be perfect for another."

Nicotra of Microtrol echoes Halamka's concern for understanding the company's needs first, and therefore favors interactive, on-line systems. "We use Graham-Dorian packages, because of their ease of modification," he says. "You can enter hours into the payroll, and they automatically and immediately go to general-ledger and job-costing programs for use there."

That kind of on-line processing once was the province of large, expensive machines beyond the scope of most small businesses. Nicotra notes, however, that one of his most recent installations handles all such on-line multiprogram processing on a Xerox 820 personal computer supplemented by a simple modification package that effectively doubles its data storage capacity.

Most end users should never be concerned with program modification, Nicotra says. "But we were faced with a construction company whose hourly pay structure was a nightmare," he adds. "Every employee had all kinds of different pay rates, depending on the kind of work he was doing on a particular day. And it all had to go to job-costing routines. The Graham-Dorian package allowed us to reshape it to meet the particular user's needs."

The message is obvious: If a small businessman has special needs, he'd better shop long and carefully after first identifying those needs exactly. And if those needs are very special, the businessman might save a lot of time, trouble and money in the long run by paying for outside special programming rather than trying to save a few dollars with an off-the-shelf application package.



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DeskMaster: The Soul Of A Program

How would you write a program to help with the little things that are necessary in your job? Read this article, and you'll be able to get started

by Leon Starr

Editor's note: Personal Computing recently commissioned Leon Starr to prepare a program that would include the four applications professionals want most—word processing, filing, appointment scheduling and calculating—to be made available at no additional cost to Personal Computing subscribers who renew their subscriptions. In the following article Leon relates his experiences (and, yes, frustrations) as he created this program from a glimmer of an idea all the way to a full-fledged working piece of applications software.

It's inevitable. Just as the horse-

Leon Starr is a principle of Educomp, a firm that trains people in the use of computers.

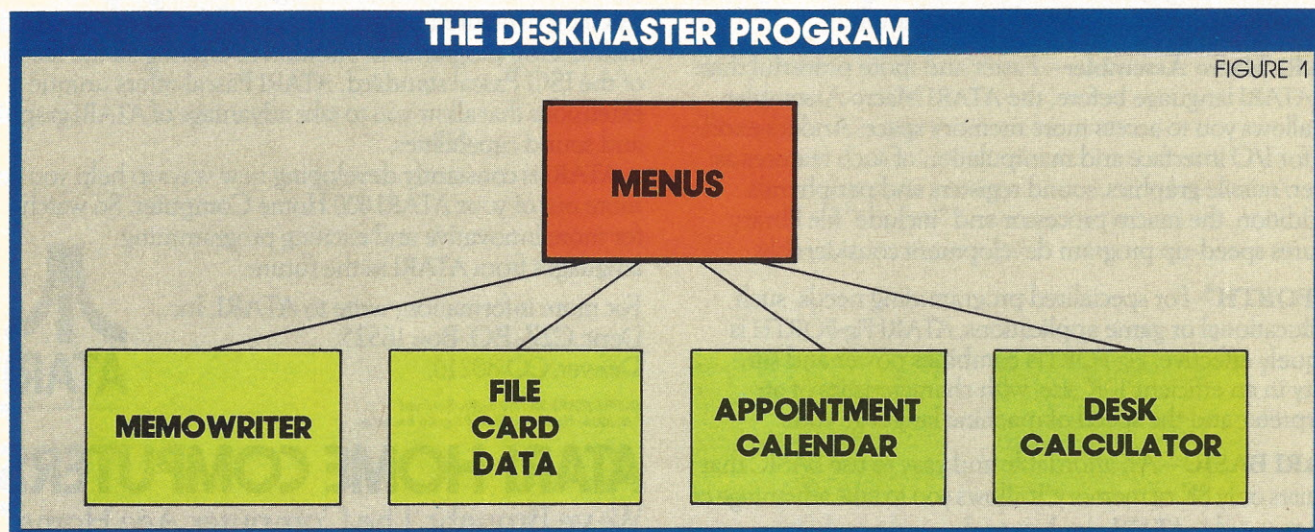
man will at some time want to do more with his horse than just ride it, the rifleman more with his rifle than just shoot it, the sailor more with his boat than just sail it, so too, will the person who enjoys computing want to do more than just run canned programs. To do that "more" with a personal computer, you will have to program.

You don't have to be a genius to do that. All it takes is a little thought and initiative.

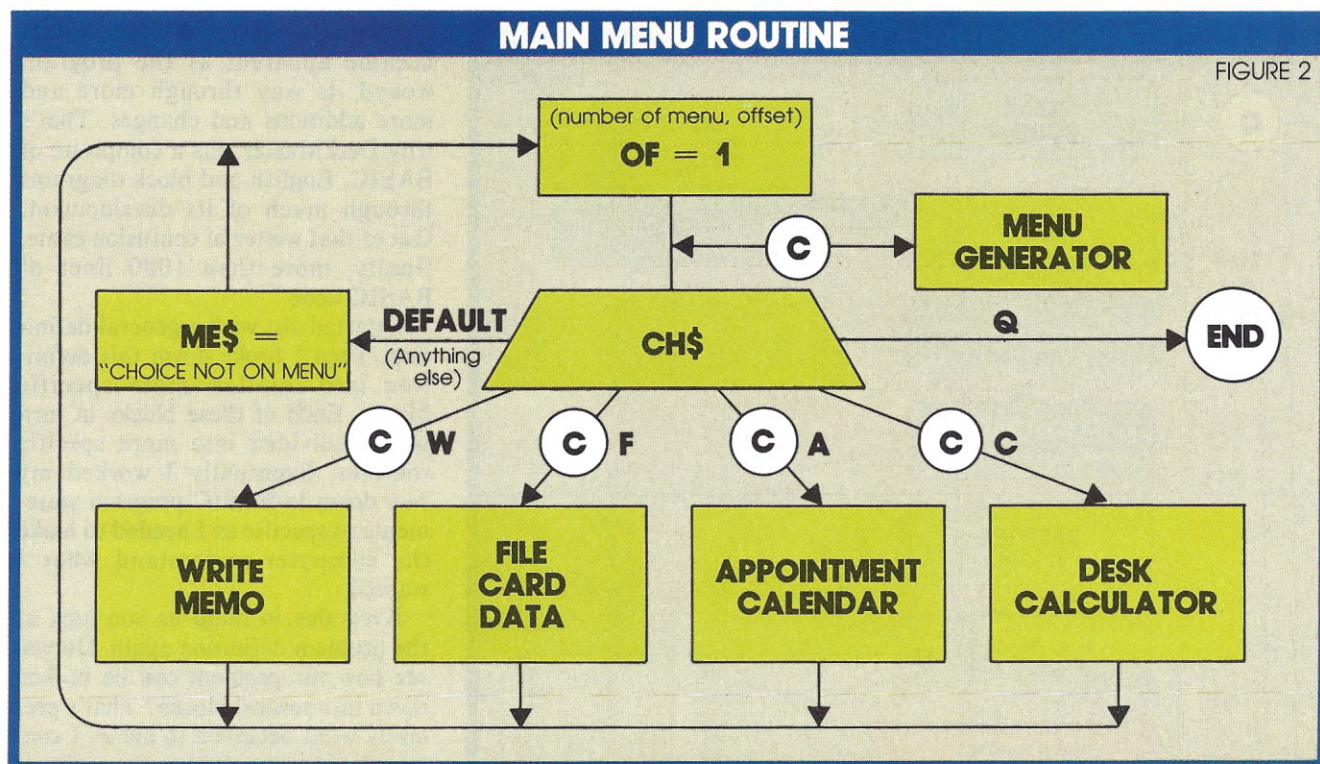
In the March, April and May issues of *Personal Computing*, I presented a primer on programming that paved the way for a conceptual entry into the world of computer programming. The series that begins here will take you beyond the entry stage into the realm of programming.

The vehicle to this journey into programming is a real software package that I created called DeskMaster. DeskMaster is specifically designed to provide a window into the worlds of both software use and development. DeskMaster itself is a multi-purpose program for the new computer user. Combined with these articles, it provides an invaluable learning experience for the beginning programmer.

Rather than give you a narrative explanation of what DeskMaster is and how it works, I'm going to discuss the thought processes that I experienced while designing the program. It's important to realize that not all of these thoughts were joyous outbursts of creativity, as they might seem while you're reading this. At any lev-



“Just as the horseman will want to do more than just ride his horse, so too, will you want to do more than run canned programs.”



A menu examines the choice the user has made to determine the destination of program control. The *main menu* of Deskmaster makes use of a *menu generator* which selects a menu based on the value of *OF*. Other menus within the *memo* and *file* routines will similarly make use of the *menu generator*.

el of experience, it is impossible to avoid temporary obstacles or roadblocks in the mind. In the face of such demons, only patience and persistence, combined with well-timed coffee breaks, will carry you through.

Problem definition

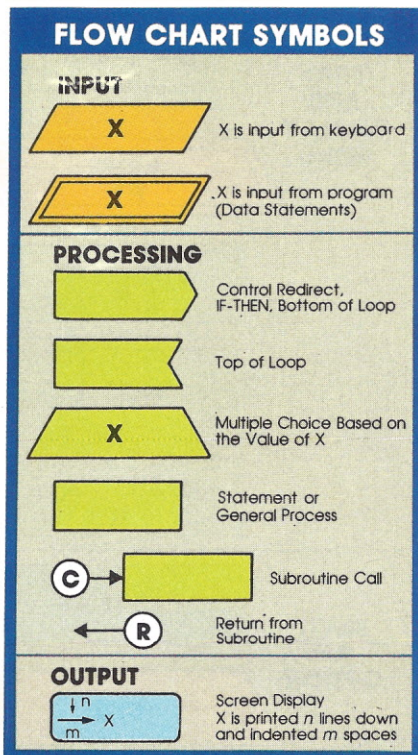
Every programming problem starts with a definition. I was asked, for example, to write a BASIC program that would provide the new computer user with a light, useful software package that would include the most commonly used program types. There seem to be four main categories of heavily used personal-computer applications software. They are, in no special order, word processing, information organizing-and-managing, planning and calculating. To provide all of these features in one

program, they had to be simpler versions of their heavy-duty counterparts. There's a benefit to that: Since these routines are simple, they are very easy to explain.

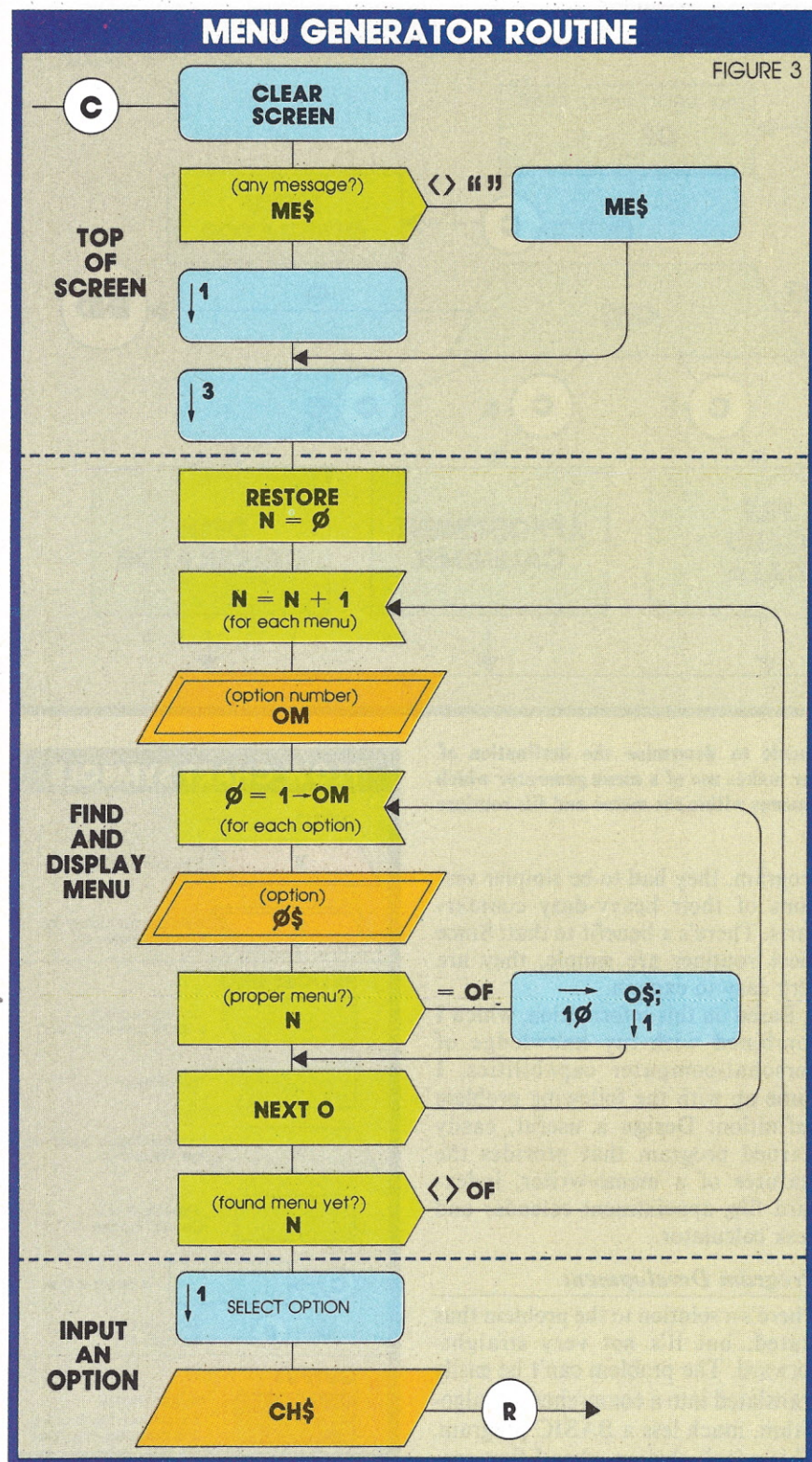
Based on this information, which I combined with my knowledge of personal-computer capabilities, I came up with the following problem definition: Design a useful, easily learned program that provides the features of a memo-writer, index-card file, appointment calendar and desk calculator.

Program Development

There's a solution to the problem thus stated, but it's not very straightforward. The problem can't be easily translated into a comprehensive algorithm, much less a BASIC program. This wasn't obvious when I first con-



"You don't have to be a genius to program. All it takes is a little thought and initiative."



templated the program, but it soon became apparent as the program wound its way through more and more additions and changes. That's why DeskMaster was a composite of BASIC, English and block diagrams through much of its development. Out of that welter of confusion came, finally, more than 1000 lines of BASIC code.

I started out with a general definition. Then I broke down this definition into smaller, more specific blocks. Each of these blocks in turn was subdivided into more specific routines. Eventually I worked my way down to BASIC program statements as specific as I needed to make the computer understand what I wanted.

Keep this in mind as you look at the problem definition again. Do you see how the problem can be broken down into several blocks? That's precisely what occurred to me as I contemplated the task late one night. It seemed to separate naturally into four pieces, each of which represents one of the major program pieces.

Now I had to think of the program elements I would actually use. I knew there had to be some way for the user to tell the computer what he wanted to do, and then to get the computer to switch program control to the one block of the four that was the desired function.

That kind of requirement just naturally suggests a menu approach.

A menu from which to choose

In more concrete terms, here's the problem definition I formulated: Write a procedure that will display a set of options, get a choice from the user, and finally returns control back to the calling menu routine.

After starting a menu routine, DeskMaster sidesteps to the menu generator which displays an error message if necessary, selects and displays a menu, obtains an option from the user, and finally returns control back to the calling menu routine.



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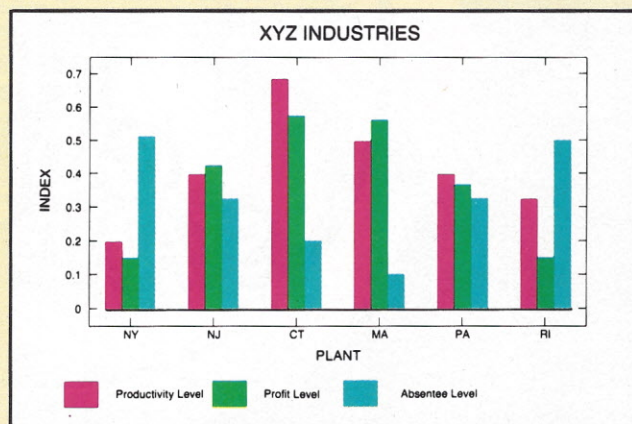
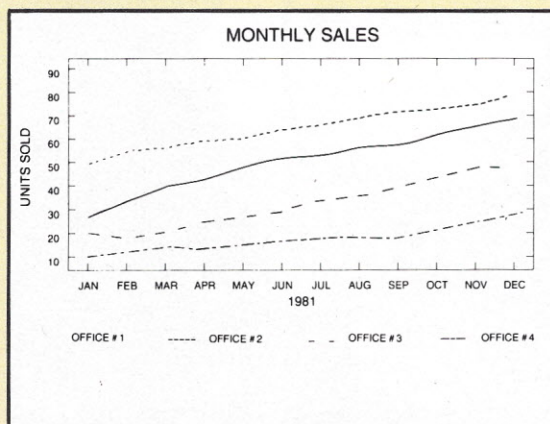
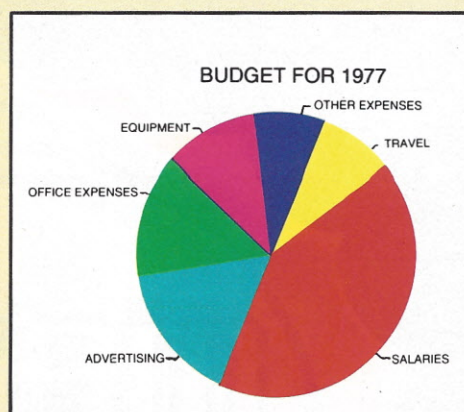
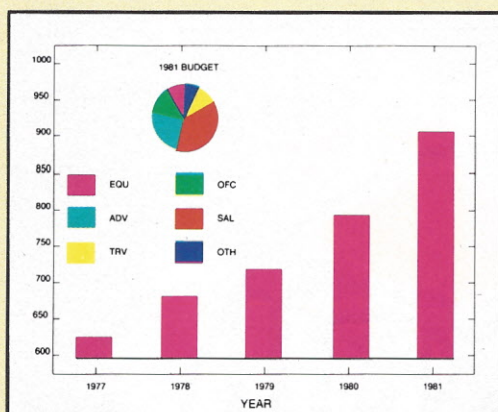
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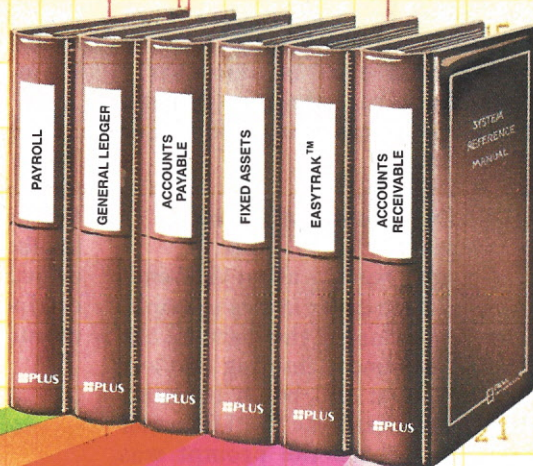
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"In the face of programming roadblocks, only patience combined with well-timed coffee breaks will carry you through."

(continued from page 126)

user, and then switch control to the appropriate subroutine.

The first part of the program is fairly easy. It's simply output, which is accomplished with a series of PRINT statements like this:

```
10 PRINT "Write Memo (W)"
20 PRINT "File Cards (F)"
30 PRINT "Appointments (A)"
40 PRINT "Calculator (C)"
50 PRINT "Quit (Q)"
```

This is, of course, only a simplified example of what the real DeskMaster code looks like. (I will indicate when I'm using the real thing.)

The next part is also fairly straightforward. I needed to output a prompt and then input a selection as shown here:

```
60 PRINT: PRINT
70 PRINT "Select one of the
   above: "; INPUT CH$
```

You may wonder about the semicolon and the colon in this example. The semicolon is the part of the PRINT statement ensuring that any further output will be on the same line. In this case, the INPUT cursor will stay where the prompt was printed.

The colon merely allows us to put two or more statements on the same line with the same line number. Line 70 is effectively two instructions in one. The following code will do the same thing:

```
60 PRINT
70 PRINT
"Select one of the above: ";
80 INPUT CH$
```

I used the first method, though, because it saves memory space and it allows me to put statements with similar purposes together.

Finally—the tricky part. I needed to switch to the routine that corresponds to the choice in CH\$. Here is a section of the actual DeskMaster code that I came up with to do this:

```
2145 IF (CH$="W") THEN
    GOSUB 2800 : GOTO 2140
```

```
2150 IF (CH$="F") THEN
    GOSUB 3850 : GOTO 2140
2155 IF (CH$="A") THEN
    GOSUB 27900 : GOTO 2140
2180 IF (CH$="Q") THEN
    GOTO 2200
2190 ME$="Choice not on menu"
2195 GOTO 2140 : REM Loop
    ended with the quit selection
2200 END
```

For now, just pretend that line 2140 exists at the top of the menu and that it causes the options to be displayed. (I'll explain why later.) Notice that every selection causes a different routine to be called. Since these lines include the GOSUB statement, a word of explanation is probably in order.

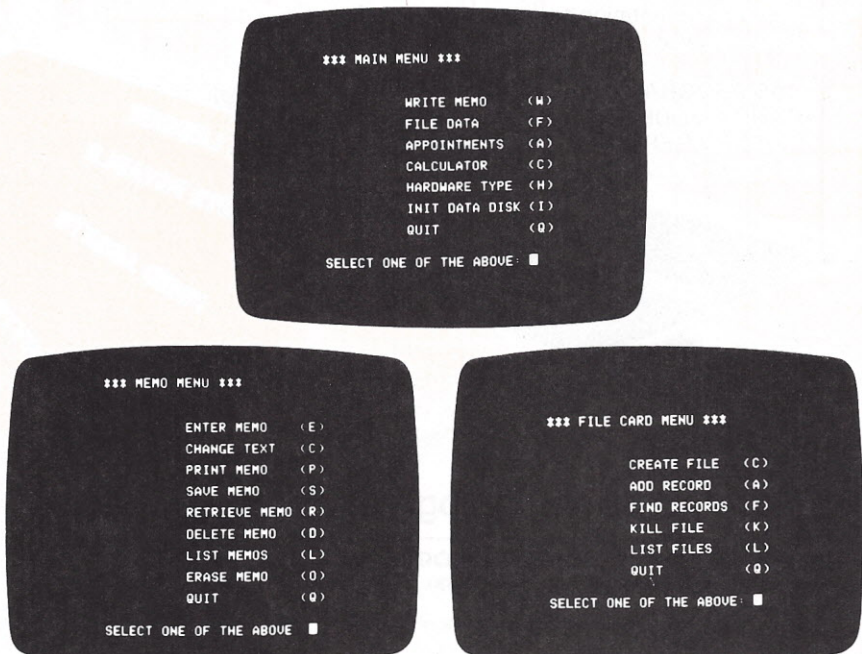
Transferring program control

When BASIC sees a GOSUB statement, it transfers program control to the statement that is named (by a line number) in the subroutine call (a fancy name for GOSUB). Execution continues on the statements that sequentially follow the statement listed

in the call until a RETURN statement is encountered. Program control then returns to the point where the program was before it wandered off to execute the subroutine. This means that in the example above the program will jump to line 2800 when it encounters the first GOSUB. Statements following 2800 will then be executed until a RETURN is found, at which point the program will jump to the middle of line 2145 and execute the next instruction, GOTO 2140. When control returns to the menu, the menu is redisplayed.

The reason I put a GOTO statement after each subroutine call is to ensure that one and only one option is executed per selection. For example, if lines 2145 to 2155 did not refer control back to the top of the menu routine, if option "W" were selected, and if CH\$ were changed somewhere in the 2800 subroutine, more than one option could be called. That happened, and it caused a lot of cussing before I added the GOTOs.

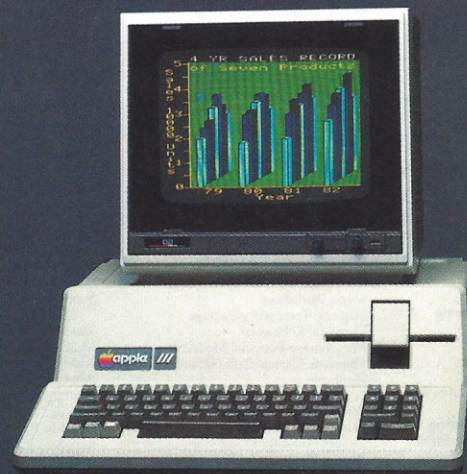
At this point, I thought I had fin-



DeskMaster's menus guide the user. From the main menu (top) for example, he can jump to the memo-writing menu, or to the filling-system menu.

GOOD NEWS

Have you put aside buying a color monitor because it's too expensive? But, have you looked at the new TAXAN RGBvision color monitor? Would you be excited at a suggested retail price of \$399.00 for the RGBvision I, and \$599 for the RGBvision II?

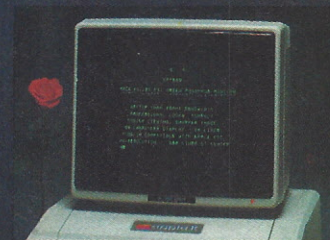


DO WE HAVE GOOD NEWS FOR YOU!

For those low prices, you can have:

- ✓ Full compatibility with Apple III and IBM PC without interface modules
- ✓ Compatible with Apple II through the TAXAN "RGB-II" card
- ✓ RGBvision I medium resolution - 380(H) lines
- ✓ RGBvision II high resolution - 510(H) lines
- ✓ Unlimited colors through linear amplifier video circuit and 16 colors for Apple III and IBM PC
- ✓ 12-inch, 90° deflection CRT display

Can you really afford to turn all that down without looking at the TAXAN RGBvision monitors? See your local dealer for a demonstration.



TAXAN 12" green phosphor monitor, model KGI2N, features an 800 line resolution at center, 2000 character display.



TAXAN

TSK ELECTRONICS CORPORATION

1524 Highland Avenue
Duarte, California 91010
A subsidiary of Kaga Denshi

Apple II and III are trademarks of Apple Computer, Inc.
IBM PC is a trademark of International Business Machines, Inc.

WILL SOMEONE PLEASE TELL

ACCOUNTING

Account Keeper
Accounting Plus II
Accounting Plus II Biz Package
Accounts Receivable
Accounts Receivable Balance Forward
Accounts Receivable/Sales Analysis
ACS Basic Accounting System
AMI Client Write-Up
Asset Record System
B/F Accounts Receivable System
Billings Management
Bookkeeper II General Ledger
Bookkeeper II-Depreciation
BPI General Ledger
Business Accounting
Business Check Register and Budget
Business Control System
C.P.A.
Client Accounting System
Construction Accounting
CPA Client Write-Up
Datawrite Client Write-Up System
Delivery Service Automation
Depreciation Calculations and Reports
Executive Accounting System
Financial and Management Accounting
Financial Partner
Fixed Asset Accounting
Fixed Asset Depreciation
Fixed Assets/Depreciation Schedules
Fund Accounting System
General Accounting
General Accounting Package
General Ledger
Glector
Insout Accountant System
Integrated Accounting System
IRAP
Ledger System Business Module
Management - Financial Reporting
MAXILEDGER
Microaccountant Accounting System
MICROLEDGER
MJA Multi-Journal Accounting
Nominal Ledger
One-Type Accounting System I
One-Type Payroll and Accounting
Paysystem Accountant
Peachtree General Ledger
SBOS General Ledger
SNIP - Integrated Accounting
TCS Accounting
TCS Client Ledger
TCS General Ledger
TCS Total Ledger
The Accountant Finance Data Base
The Bookkeeper System
The Boss Financial Accounting
The Business Bookkeeping System
The Controller
The Depreciation Planner
The Software Fitness Program

AGRICULTURE

Adjusted Weaning Weights
BEEFUP-Herd Management
Performance
Cattle Feeding Economics
Corn Harvest Losses
Corn vs. an Alternate Crop
Cow-Calf Profitability
Crop Yields
Economics of Corn Production
Farm Management
Farrow-To-Finish Swine Production
Feeder Pig Production
Fertilizer Formulation
Field Population
Field Size
Finishing Feeder Pigs
Job Cost (Crop Cost)
Least Cost Fertilizer Application
Liming Soil
Liquid Manure and Fertilizer
Net Energy for Feedlot Cattle
PEDIGREE-5 Generation Annotated
Pedigree
Protein Balancing for Feedlot Cattle
SBOS Agri-Ledger
Selling Wet Corn vs. Dry
Sheep Production Economics
Soil Erosion
Soybean Harvest Losses
Swine Ration Analysis
Swine Ration Formulation

APPLICATION PROGRAM DEVELOPMENT AIDS

A-FORTH
ABT Pascal Tools
APEX-6502 Assembly Language
Apple-80 Disassembler
Assembly Language Development System
AUDEX-Audio Programming Aid
CBASIC Program Maintenance Utilities
CINDEX
Cosapple 1802 Disassembler
CRIFORM Programmer Productivity
Diagnostics II

DISTEL-Disk Based Disassembler
Executive Planning System
Floating Point Dictionary
Forms 2
Key Perfect-Checksum Table Generator
Linkdisk-Disk Utility for Apple Pascal
Linkvideo-Screen Utility
Lower Case Character Generator
MULISP/MUSTAR-80
OGI-Forth-Implementation of FIG-Forth
Pascal Programmer
Pascal Level I
Pearl III-Rapid Logic Generator
Personal Programmer
Prism/Ads Data Base Generator
Program Development System I
Program Writer for Non-Programmers
Programming Aids 3.3
Quic-N-Easy Application Development
RAID-Real Time Assembly Debugger
Scientific Data Base
SID-Symbolic Instruction Debugger
Stok Pilot-Menu Generator
STRING-80
STRING-BIT
Systems Analyst
Teacher Plus Teaching & Reference Pkg
The BASIC Teacher
The Last One-Program Generator Pkg
The Toolbox Programming Utilities
Tiny-C-Interactive Programming
UCSD Pascal
Unlock Development Tool
V-COM Disassembler Package
Z8000 Cross Assembler

BUSINESS MANAGEMENT TOOLS

Analyst-Business Productivity
Apple Sack General Business Program
Bookkeeper II-Sales Analysis
Business Pac 100
Business Planner
Creative Financial Package
Desktop/Plan
Execuplan Planning & Forecast
Financial Modeling System
Financial Planning Series
Financial Planning/Analysis
Finplan/Financial Planning
FP2020 Financial Planner
FPL-Financial Planning Language
Magic Worksheet
Magical-Forecasting Package
Micro-DSS/Finance
Microfinesse-Financial Modeling
Milestone-Critical Path Network Analysis
Optimiser
PFS-Personal Filing System
Personal Report System
Plan 80-Financial Planning & Analysis
Project Boss-Mgr's Cost Control System
Project Planning and Budgeting
Retail Purchasing & Pricing
Salary Planner
Senior Analyst
Supercalc-Electronic Spread Sheet
Support Pkg for Real Estate Mgmt
T/Maker II-Visual Calculating Tool
The Analyzer
The Budget Planner
Universal Business Machine Planning
and Forecasting
VisiCalc III
VisiCalc Real Estate Template

CAPITAL PROJECTS PLANNING & CONTROL

Angle Project Scheduling
APM-Project Management System
Jobtrak-Project Tracking
Milestone Project Management
Project Management System
Project Planning

COMMUNICATIONS

Apple Access III
BISYN-80
BSTAM
Class Data Recorder
CM-900 Burroughs Network Services
Communications Program
Crossstalk Smart Terminal/File Transfer
Data Capture 4.0
Data Transporter Package
Datalink
DTS-3-Serial Data Transfer
Electronic Mail
IBM-CP/M Allows Transfer of Data
IE/Modem
Intercom Communications
METTY-Intelligent Terminal Package
Micro-Courier
Micro-Telegram
Microlink-80-File Transfer Program
Reformater-CP/M IBM Data Transfer
Remote Console Program
Smarterm-CP/M Terminal Program
Term II-Computer Intercommunications
Term Intercommunications Package
TTY-Communications With Other
Computers
U-Net-Shared Resources Network

Ultimate Transfer
Visiterm-Communications Program
VT-100 Emulator
Western Union Interface

DATA MANAGEMENT

ANALYST
CBS-Configurable Business System
CCA Data Mgt System
CM 2020 Configurable Manager
Condor Series 20
Data Management Program
Data Manager
Data Master
Data-View Electronic Filing Cabinet
Database II
Database Management
Datafax
Dataflow-Info Processing
Datastar
Datastore
Datatree
Disk-Edit-Screen Oriented Disk Editor
DMS-Data Mgmt System
FABS II-Rapid Keyed Access
Fast Entry for Tabs Business Modules
FINDAFYL-Reference Retrieval System
FMS 80-Data Base Management System
GBS Database
General Database
HDBS-Hierarchical Data Base
IFO Database Manager
Information File Organizer
Information Master-Data Mgmt System
KTDS-Key to Disk, Data Entry
Linkindex-Pascal Utility
MAG/Base-Data Base Management
Manager-Relational Data Base
MDBS-DRS-Micro Database Mgt System
MUMPS-Language for CP/M Database
Optimum Data Mgmt Program
PRISM/IMS-Information Mgt System
RADAR-Random Access Data Acquisition
Reprogrammable Data Base
Scientist-Data Base & Statistical Pkg
Selector III-Data Base Processor
Selector IV-Data Base Mgt
Selector V-Key Access Info
Selector V-Data Base Mgmt
STATPRD-Integrated Database System
Stoneware Utility Package
Super Kram II - Multi-Keyed
Random Access
The Reprogrammable Data Base Program
VisiDex-Data Base Mgt System
VisiFile-Data Base Mgt Package
Whatsit?-Conversational Query/Retrieval

DATA SECURITY SYSTEMS

Absolute Security
Encode/Decode Security System

DISTRIBUTION

ABT Retail Manager
Beer Distributor Management
Inventory, Order Entry, Invoicing
Oil Jobber Management System
Order Entry and Inventory Control
The Store Manager
Wholesale/Retail Distribution System

EDUCATION - BUSINESS

Accounting Tutor
Comparative Buying
Income Meets Expenses
Interactive Typing Tutor
Job Readiness-Assessment &
Development
Mastery-Typing Instruction
Money Mgmt Assessment
Typing
Typing Tutor
You Can Bank On It-Bank Concepts

EDUCATION - CHEM/PHYSICS

Acid-Based Chemistry
Atomic Structure
Chem Lab Simulation
Chemical Equilibrium
Chemistry With A Computer
Fundamental Skills for General Chemistry
High School Chemistry
High School/Jr. College C.A.I. Biology
High School/Jr. College C.A.I. Physics
Organic Nomenclature
Physics

EDUCATION - ENGLISH

A Batch of Endings
Agreement of Pronoun/Antecedent
Alphabetize
Capitalization
Catalog Cards
Commas
Compu-Read
Compu-Spell
Coordination
End Marks
Excess Words
Faulty Coordination
Hearing the Homonyms
Irregular Verbs

Is It "ie or ei?"
Language Drill
Locate Books on the Shelf
Magic Spells
Misplaced Modifiers
Parallel Structure
Possessing the Possessives
Prefixes & Suffixes
Quotations
Reading Level
Readings In Literature
Run On Sentences
Scramble
Sentence Diagramming
Sentence Fragments
Speedreader
Spell-N-Time
Spelling Bee with Reading Primer
Spelling Thesaurus
Still More Nasty Demons
Subject/Verb Agreement
Subordination
The End of the Endings
Those Nasty Demons
Understand the Card Catalog
Understand the Title Page
Use an Index
Use the Table of Contents
Using Adjectives/Adverbs Correctly
Word Scrambler & Super Speller

EDUCATION - MATH

Addition & Subtraction
Algebra I
Basic Math Skills
Compu Math: Arithmetic Skills
Compu-Math Decimals
Compu-Math Fractions
Counting Bee
Decimal Estimation
Division Drill
Drill II
Elementary Math
Fractions
Geometry
Geometry and Measurement Drill
Lessons in Algebra
Matching and Using Numbers
Matching Geometric Figures
Math-Addition & Subtraction
Matrix Mathematics Package
Measurements
Multiplication & Division
Mumath-PO Symbolic Math
New Subtraction
Numerical Analysis Mathematics
Problem Solving
Problem Solving in Everyday Math
Sets
Sign Drill/Typing
Statistical Analysis I Mathematics
Statistics 3.0
Typing Fractions

EDUCATION - MISC.

ZES Courseware
American History Through
Biographies
American Indians
Antonyms
Apple Sack 2 Home Education
Approximate Measure
Astronomy I & II
Concentration-Taxing
Counting Calories
Early Civilization
Educational Package
Educator's Disk
Family Fun
Farm and Farm Products
Hi-Res Life
History
Home Safe Home
Insects
Light Pen Quiz
Literature
Living Things
Math, Sports, Etc.
Middle Ages
Money
Mojothon
Mother Goose Rhymes
Music/Art
Our Bodies
Poison Proof Your Home
Questions & Answers in Biology
Questions & Answers in History
Quizstar
Reverse/Sampling
School Days
Sentence Beginning
Shore Features
Sound
Supermap
Synonyms
Systems of the Body
Teacher Create Series
Teacher Plus
Telling Time
The Basic Teacher Pac
The Earth and It's Composition
The Professional-Teaching Program

The Solar System
Transportation History
Typing
United States
Visual Perception Tests
Weather Fronts
Work Relationships
World Desert Region
World Polar Regions

FINANCE-INVESTMENT & PORTFOLIO ANALYSIS

Analysis I-Stock Trend Data Analysis
Commoapx System
Computerizer
Computrac File Reader
Dow Jones News &
Quotes Reporter
Dow Jones Portfolio Evaluator
Dowlog-MC
Electronic Stock Package
Engineer's System For Trading
Forecast I
Forecast II
Fotofolio-Visual Display w/Statistics
Gann's Square of Nine Analysis
Intelligent Investor
Investment Analysis
Market Charter-Technical Analysis
Moneybee-Investment Analyst
Options 80-Stock Options Analyzer
Portfolio Master
Quotechart
Quoteprocessor
Ratortn-Investment Analysis
Stock and Options Analysis
Stock Forecasting
Stock Market Management
Stock Market Utility
Stock Option Analysis
Stock Tracker
Stock Valuation Program
Stocksheets
Strategy M-Monitor Price Change
Dynamics
The Clover Method Trading System
The Stock Portfolio Program
Tickertec-Tickertape Program
Wilens 6 Systems Analysis

FOREIGN LANGUAGES

Chinese Lessons
Foreign Words and Phrases
Greek Roots and Prefixes
Japanese Lessons
Latin Roots and Prefixes
The French Hangman
The Russian Disk
The Spanish Hangman

GAMES

Adventures
Alien Rain
Alien Typhoon
Almanac - The Time Machine
Amaze
Analyze
Animal
Anti-Ballistic Missile
Apple Adventure
Apple Bowl
Apple Fun
Apple Panic
Apple Sack 3 - Adventure Pak
Apple Sack 7 - Space Sack
Apple Sack 8 - Game Sack
Apple Sack 9 - Base Star
Apple Stellar Invaders
Apple-oids
Asteron
Astro-Scope
Astrology
Autobahn
Backgammon 20
Battle of Midway
Beer Run
Best of Muse
Biorthms
Blackjack
Both Barrels
Brands
Bridge 2.0
Bridge Tutor
Bubbles, Planetsoids and Burnout
Cartels and Cutthroats
Castle Wolfenstein
Chambers of Xenobia
Chebychev I
Chebychev 2
Chronicles of Osgroth
Civil War
Compu-Math Arithmetic
Compu-Math Decimals
Compu-Math Fractions
Computer Air Combat
Computer Baseball
Computer Bismark
Computer Conflict
Computer Napoleons
Computer Quarterback
Cops and Robbers
Cosmo Mission

County Carnival
Cyber Strike
Disk Talker
Dr. Chips
Dragon Fire
Dungeon
Executive Fitness
Falcons
Fantasyland 2041
Fastgammon
Flight Simulator
Galactic Attack
Galactic Wars
Galaxy Wars
Games People Play
Gamma Goblins
Gobbler
Gold/Cross-Out
Gorgon
Hamurabi
Head On Game
Hellfire Warrior
Hi-Res Football
Hi-Res Soccer
In The Army Now
Into Ships
Jet Fighter Pilot
Klondike 2000
Lost By Ship
Mastermind
Meteoroids in Space
Micro Othello
Mimic
Mind Games Package
Mission Asteroids
Mystery House
Need an Analyst
Nominos Jigsaw
Oil Tycoon
Olympic Decathlon
Operation Apocalypse
Orbitron
Outpost
Paddle Fun
Pegasus II
Perception 3.0
Phantoms Five
Planetoids
Plot 3D
Poker Slot Machine
Pool 1.5
Pot 'O Gold I
Pot 'O Gold II
President Elect
Pro Football
Pro Picks
Project Omega
Pulsar II
Race For Midnight
Raster Blaster
Red Baron
Rendezvous
Robot Wars
Sahara Warriors
Sargon II (Chess)
Satellite Trak
Shell Games
Shuffleboard
Skybombers
Skybombers II
Sneakers
Snoggle
Soft Porn
Softside Publications
Space Eggs
Space Warrior
Spelling Bee
Spelling Bee
Star Cruiser
Star Dance
Star Thief
Startraders
Startrak
Stock
Sub Attack
Tawala's Last Redoubt
Teacher's Pet
Temple of Apsal
Terrorist
Tetrad
The Strip
The Asteroid Field
The Great Escape
The Horse Selector II
The Prisoner
The Scorekeeper
The Shattered Alliance
The Warp Factor
Three Mile Island
Torpedo Fire
Ultima
Voyage of the Valkyrie
War and Games
War Games
Warp Factor
Watch Your Moves
Win at the Races
World's Greatest
Blackjack
Wumpus
Xplode

ME WHAT AN APPLE CAN DO?

GRAPHICS/ COMPUTER-AIDED DESIGN

3-D Surface Plotter Package
A2-3D1 Graphics Family
ABT Barwand Software
Action Sounds & Hi-Res Scrolling
Apple Plot
AppleGraphics II
Artist Designer
Bar Chart (Histogram) Graphics
Business Graphics III
Circuit Designer Graphics
Circuit Simulator
Creativity Tool Box
CURVIT
Data Plot
E-Z DRAW
FLGDZINE
Graforth — Development Tool
Graph-Fit
Graph-Pak
GRAPHPOWER
Hi-Res Secrets
Line Graphics
MC Painting
ORIFICE
Pascal Animation Tools
Pascal Graphics Editor
Perspective Plot — 3-D Graphics
PGE — Graphics Editing Package
PILOT Animation Toolkit
Polar Coordinate Plot
RGL Real Time Graphic System
Screen Director
Shape Table Generator
Stats-graph
Super Shape Draw & Animate
Tablet Graphics
The Coloring Board Program
The Designer
Topographic Mapping
Ultra Plot
Utopia Graphics Tablet System
VACUESL — Vacuum Vessel Design
VESDZINE — Design of Vessels
VISITREND/VISIPLOT
XY Vector Plot Package

HOME MANAGEMENT

Address File
Auto Records
Checkbook Balancing
Checking Account Management
Chequemate
Diet Analysis
Financial Analyzer
Five Minute Financial Check-Up
Grocery List
Home Finance
Home Inventory File
Home Money Minder
Home Purchase Analysis
Magazine File
Mortgage Analysis
Personal Accounting System I
Personal Expense Record
Personal Finance Manager
Personal Financial Planning
Programmed Exercise
The Personal Check Manager

INCOME TAX

Dow Jones Portfolio Evaluator
Individual Tax Planner
Micro-Tax Individual Tax Package
Micro-Tax Integrated State Income Tax
Micro-Tax Partnership Package
SHORTAX — Tax Planning Package
Tax Planner
Tax Preparer
TRPS — Tax Return Preparation System

INVENTORY CONTROL

ARM-1000 — Rental Business
Basic Business Inventory
Bill of Materials
BPI Inventory Control
Inventory Inventory System
Inventory Accounting
Inventory Control
Inventory Management
Inventory Management for Stock Control
Inventory Pac
Inventory System Business Module
Manufacturing Inventory Control
MATSDAT-Materials Tracking
Order Entry/Inventory Control
Peachtree Inventory System
Point-Of-Sale Retail System
Property Manager for Moveable Equipment
Retail Inventory
Rogis Stock Control for Components
Stock Control
Stock Recording
Stocking Inventory System

Stockroom Inventory and Purchasing
Structured Systems Inventory Control
TCS Inventory Management
The Order Scheduler

JOB & CONTRACT COST ACCOUNTING

Billflow
Bookkeeper II-Job Costing
BPI Job Costing
Contract Billing
Contractor Job Cost
Cost Accountant
Job Accounting System
Job Control System
Job Cost Accounting
Project Cost Accounting for Architects
Project Cost Accounting for Engineers
The Software Fitness Job Cost Analyst
Time Recording-Job Cost Analyst
Timerec-Transaction Carry Forward

MAILING LIST & LABEL PROCESSING

Address Book Mailing List
Apple III Mail List Manager
Apple Mail Sack
Apple Post
Benchmark Mail List
Commercial Mailer
Mail List
Mail80 Mailing List Software
MAILER-Name & Address Management System
Mailing Address
Mailing List Package
Mailing System
MAILMERGE
MAILPRO
Mailroom-Mailing List Management
Master Mailing List
NAD-Name & Address Selection System
Name And Address
Postmaster-Mail Management
Professional Mailout
School Mailer
Small Business Mailing & Filing
Super-M-List Mailing List Program
Ultra Plot/Mailing & Filing System I

MARKETING/SALES ANALYSIS

EASYTRAK-Salesmen Monitoring Package
Marketing Systems — Proposal Developer
Office and Agent Productivity Package
Sales Analysis
Sales Pro Prospect Mgt Package
Sales Tracker
SALESLOG — Sales Mgt Program
SNAP — Questionnaire Design and Printing
TCD Life Insurance Computer System

MISCELLANEOUS

BILL — Building Energy Use
Circuit Analysis
Hand Holding BASIC
Insulate
Mini-Warehouse System
Stepwise Multiple Regression

MUSIC

Alpha Syntauri Music Synthesizer
Apple Music Theory
Apple Sack Music & Graphics
Appledion Music Synthesis System
Music System
Musicomp
The Electric Duet

ORDER ENTRY/ ACCOUNTS RECEIVABLE

BPI Accounts Receivable Program
Cash Receipts System
Company Sales
Invoice Compiler
Invoicing
Membership Billing
MICROREC
Multi-Property Accounts Receivable
Open Item Accounts Receivable
Order Entry
Order Entry and Billing
Order Entry and Invoicing

Order Tracking System
Peachtree Accounts Receivable
Peachtree Sales Invoicing
Progressive Billing
Purchase Order System
Receivables System Business Module
Receiver
Sales Invoicing
Sales Ledger
Sales Order Processing
Software Fitness Program — A/R System
Structured Systems Accounts Receivable
T-SOP Sales Order Processing
TCS Accounts Receivable Package
TCS Total Receivables
The Biller

PAYROLL PROCESSING

Advanced Payroll Package
After-The-Fact-Payroll — updates records
Apple Payroll System
Bookkeeper II-Payroll
BPI Payroll
Business Basic Payroll System
Contractor Payroll
Jobcost Payroll
Micropayroll
Passive Payroll
Paymaster
Paymaster-Payroll System
Payrecord I
Payroll
Payroll Accounting Package
Payroll Assistant
Payroll I
PeachPay
Piece Rate Payroll System
Post Facto Payroll
Print/Paycheck Accounting System
Run Time Payroll Program
Sheltered Workshop Reporting
Structured Systems Group Payroll
TCS Payroll Package
TCS Total Payroll
Variable Worker's Compensation
WH-347-Accessory program for Jobcost

PERSONNEL MANAGEMENT

AMI Post-Facto Payroll
MICROPSERS — Payroll & Personnel Mgmt
Personnel Data Recorder
Personnel Office — Federal Compliance
Personnel Record
Personnel Record/Employee Records System

PROFESSIONAL OFFICE SYSTEMS

AMI Omegabyte Time & Billing
BETA — Stand Alone Time & Billing System
Billkeeper — Professional Billing
Client Billing System
Client Record/Bill Preparation
DataLaw System 3-Law Office Mgmt
DataTime
Dental 80A-Dental Actgng & Billing
Dental Billing Package
Dental Office Management
DentalEase
Dentistaid — Dentist Office Management
Insys (Insurance System)
Legal Billing & Timekeeping System
Legal Clerk — Office Management System
Legal Time Accounting System
Medicaid Day Treatment
Medical Accounting and Billing
Medical Clinic
Medical II — Office Mgmt System
Medical Office Management
Medical Secretary
Medical/Dental Management System
Medical/Manager
MedicalEase
MedPak
Medtips — Billing & Insurance Forms
PAS — 3-Patient Billing & Accts Receivable
Patient Accounting System
PIP-Payroll/Invoicing Program
Professional Office Management
Professional Time & Billing
PTA — Professional Time Accounting Pkg
Series 8000 Dental Mgmt

Series 8000 Medical Mgmt
Series 9000 Family Dental Management
The Patient Scheduler
Timelock
TimeMaster — Time Accounting
Timesaver Client Billing System

PROGRAMMING LANGUAGES

Ada Compiler
APL/V80 Language
Apple III Business Basic
Apple III Pascal
Apple FORTRAN
Apple Logo
Apple PILOT
ASM 65-Assembler
BASIC A+ — Extended Business Basic
BASIC Compiler
BASIC-80
BASIC/Z — Native Code Compiler
BD Software "C" Compiler
C Compiler
CBASIC 2 Compiler
CIS COBOL
COBOL 80
Cos Assembler
Cos COBOL
Focal 65-High Level Programming
Forth 86
Forth-Language Compiler
FORTRAN 80
FORTRAN IV
Hand Holding BASIC
KBASIC — Microsoft Disk Extended BASIC
Language System with Apple Pascal
LISP-80 Compiler
MAC 8080 Macro Assembler
MULISP Compiler
MULISP/MUSTAR 80
muMath/muSimp 80-High Level Programming
Nevada COBOL Compiler
Pascal Compiler
PASCAL/M86
Pascal/MY+With SPP-ISO Standard
PL/1-80-Programming Language
RATFOR — FORTRAN Language
S-BASIC
SSS FORTRAN Compiler
Softronics
Stiff Upper Lisp
TCL Disk BASIC Interpreter
TCL-Pascal
TEC 65-Editing Language
Tiny BASIC High-Level Language
Tiny C
Tiny Pascal
Tiny-C-Two Compiler
Transforth II
Whitesmith's Compiler
XPLO-Structured Language
XY BASIC Interactive Process Control

PROGRAMMING UTILITIES

Apple Sak 4 — Utility Package
Basic Utility Disk
Disk Utilities 3
Disk Utility Package
Disk-o-Tape-Pascal
DOS Tool Kit
File Maintenance Package
MAG/Sam Keyed File Mgmt System
MAG/Sort-Record Sort
Masterdisk-disk Sector Editor
MSORT — for COBOL 80
Pascal Utility Library
Pascal — Sort Program
PSORT — Pascal File Sorting
QSORT — Sort/Merge Program
SORT/B — Hybrid Sort
Supersort
Ultrasort

PURCHASING/ACCOUNTS PAYABLE

Accounting Payable
Accounts Payable Business Module
Accounts Payable/Purchase Order
Bookkeeper II — Accounts Payable
Cash Disbursements Posting System
Check Writer
Company Purchases

Contractor Accounts Payable
Disk-O-Check
Micropay-Accounts Payable
Print Check Accounting System
Purchase Ledger
Structured Systems Group Accts Payable
T-POP — Purchase Order Processing

REAL ESTATE

American Software Property Management
Apartment Building Investment Analysis
Apartment Manager
Commercial Property System
Construction Cost/Profit Analysis
Cornwall Apartment Management
Income Property Analysis
Listings
Multi-Property Accounting System
Office/Apartment Real Estate Management
Property Analysis System
Property Management
Property Management System
Property Mgmt — G/L Tenant and Expenses
Real Estate Analysis Program
Real Estate Analyzer
Realty Package
Rent vs. Buy
Rental Manager
Residential Property Management
Tax Deferred Exchange Model
Tenant Processing Package
The Landlord-Property Mgmt System
VisiCalc Real Estate Templates

TIME MANAGEMENT & SCHEDULING

Agenda Files
APM — Project Scheduling
Appointment Calendar
Color Calendar Package
Datebook Appointment Calendar
Datebook/Time Management System
GUARDIAN — Computerized Scheduling
Office Manager — Staff Appointments
Personal Datebook
Professional Secretary
PROSCHED — Project Schedule
Time Manager

WORD PROCESSING

Apple World Oriented Text Editor
Apple Writer II
Apple Writer III
Benchmark — Word Processing System
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"It's important to realize that not all of the thoughts a programmer has while programming are joyous outbursts of creativity."

SOME HELPFUL HINTS FOR CUSTOMIZING THE MENU

For those of you who have DeskMaster in hand, here are some hints on how to customize its menu system. Keep in mind that you needn't be a programmer to see how a program can be changed, just as you don't have to be a film producer to criticize a movie. In fact, it often helps to know nothing about programming, for then you may come up with ideas that are purely in the user's interest.

The question we must first consider, then, is not "How can I change the DeskMaster code?", but "How can I make DeskMaster more useful?" Let's see how this latter question pertains to menus.

There are two ways to make the menu system more useful; we can either change it or replace it with a different system. Since you stand to learn the most by trying to change an existing system first, let's try that.

A menu displays options, retrieves a response and then selects a corresponding procedure. Since the retrieval of information and the process of switching to different routines is fairly limited in BASIC, not much can be done to change the menu routines on these levels. However, it's fairly easy to alter the display format of the menus by modifying the menu generator routine.

Lines 6450, 6600 and 6650 are responsible for output. By changing the contents of the PRINT statements or adding some in this routine, you effectively change all the menu displays.

In addition, you can add new menus. You do this by entering the options into data statements after the last one. Next, you must write a menu routine that assigns a value to the variable OF, which corresponds to the position of your new menu in the series of data statements; calls the menu generator which will display your menu; and directs control to the appropriate options based on the value of CH\$.

To link your new menu into the hierarchy of the rest, you must then include another option in a previously existing menu that directs control to yours.

Hmmmm, maybe it would be better to do away with the menu system altogether in favor of something else....Many software packages make use of a command interpreter. A command interpreter doesn't display any options. All it does is give you a prompt like so >, and then it waits for you to type in a command. A command interpreter requires that you either memorize a vocabulary of commands or at least keep them written down for reference. If you get tired of wading through menus, this might be what you want to do. An example to help you get started with this program is shown below.

If you have any ideas on how these routines can be improved, don't hesitate to send them to me in care of *Personal Computing*, 50 Essex St., Rochelle Park, NJ 07662.

```
1000 REM Output an error message if any
1010 PRINT MES
1020 REM Output a prompt and get a command
1030 PRINT ">"; : INPUT COS
1040 IF COS="memo" THEN GOSUB aaaa: GOTO 1000
1050 IF COS="file" THEN GOSUB bbbb : GOTO 1000
1060 IF COS="quit" THEN GOTO 1090
1070 MES="Unknown command"
1080 GOTO 1000
1090 RETURN
```

DESKMASTER

(continued from page 130)

ished the menu routine. And I had, until I realized that there were other parts of the program that would need a menu.

The memo-writer, for example, needs to allow for the entering, editing, saving, retrieval, deletion and printing of text. A menu would probably help here, too. The card-file program is another case in point. In fact, I ended up needing two levels of menu there.

Then the thought came: Why not write a single menu generator procedure? This would have the added advantage of making the program shorter, allowing more memory space for the memos to be edited. So I did.

That sort of thing happened often with DeskMaster. I would write a routine for a specific purpose and then realize that with a few changes, I could make it useful for many similar functions. For instance, there is no command in BASIC which generates menus—we're limited to the INPUT and PRINT statements. But by creating a generalized module, I essentially added a macro (a collection of instructions) to the BASIC vocabulary which can be summoned up with a GOSUB call.

It is very difficult to write a program when you have to do everything from scratch—with no subroutine library, for example. It is unbearable if you must continually write routines which are very similar to those you wrote before. You should never have to write the same thing more than once. That's why you are using a computer in the first place. That's why I wrote the menu module.

In general, the menu prints a certain number of options, inputs a selection, and switches control to the appropriate routine. The options will always vary depending on which menu is called. This meant that my menu generator had to learn somehow which options it must display whenever it is called. In addition, the

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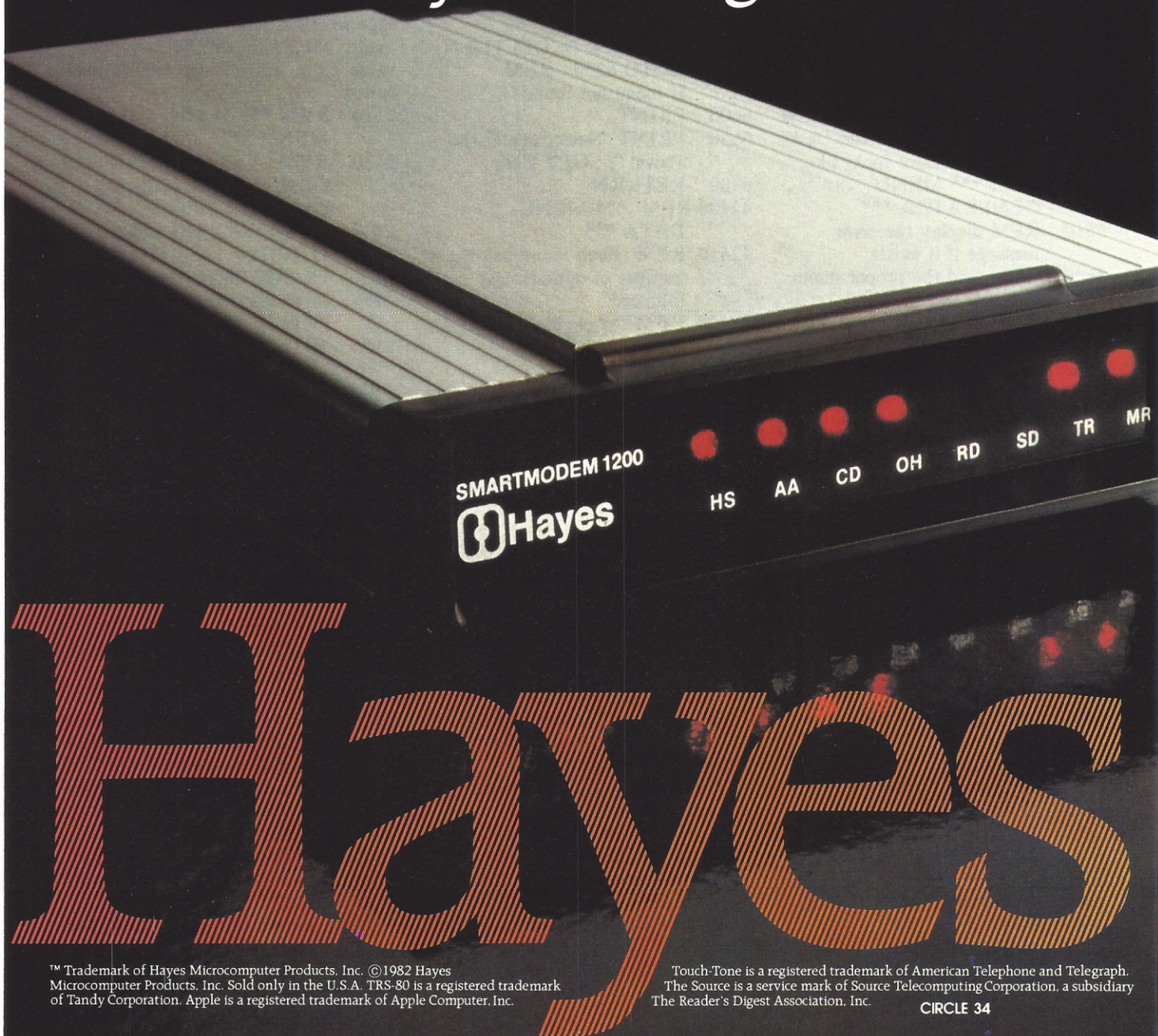
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CIRCLE 34

"A menu in a program acts just like a waiter in a restaurant. It offers the user the information the computer program can provide."

subroutines that are called in response to the selection have to be different with each menu. So, finally, I put DATA statements at the end of the DeskMaster program that contain the menu information that the menu generator uses.

If the menu generator is told which menu it must select—the first, second, third or fourth—it can use a loop to read each menu until it finds the right one, which it then displays. I tried to think of a way to pass the line number information to the menu generator, but there isn't any. That meant there would have to be a separate switching routine for each and every menu. This is what the DeskMaster menu generator looks like.

```
5600 REM *** MENU
      GENERATOR ***
5610 REM display the error
      message if it exists,
5620 REM find the proper menu
      data (42400-43900),
5630 REM display it, get a valid
      option from the
5640 REM user, and return it to
      the calling routine.
5645 REM
5650 REM Import: ME$, OF
      (error message, and menu
      number)
5700 REM Local: ES$ (error
      string), N (menu counter),
5710 REM CM, O, OS (number of
      options, option counter,
      option)
5750 REM Export: CH$ (option
      letter selected by user)
5800 REM
5850 ES$="MENU GEN"
5900 HOME : REM Clear the
      screen
5950 IF (ME$ < > " ") THEN
      PRINT "*** ";ME$; "***"
6000 IF (ME$="") THEN
      PRINT
6050 ME$=""
6060 PRINT : PRINT : PRINT
6100 RESTORE
6200 N=0
6210 REM REPEAT UNTIL
      The appropriate menu is
```

```
found and displayed
6250 N=N+1 : REM
      Count menus
6300 READ OM : REM Number
      of options
6350 FOR O=1 TO OM
6400 READ OS
6440 REM If this is the right
      menu, display option
6450 IF (N=OF) THEN PRINT
      " ";OS : PRINT
6500 NEXT O : REM Next
      option
6550 IF (N < > OF) THEN
      GOTO 6250 : REM
      If menu not found
6600 PRINT
6650 PRINT "Select one of the
      above: "; : GET CH$
6700 RETURN
42400 REM *** MENU
      DATA ***
42410 REM Each menu has the
      number of options in it
      followed
42420 REM by each of those
      options.
42430 REM
42450 REM --- Main Menu ---
42500 DATA 5, "Write
      Memo (W)"
42550 DATA "File Cards (F)"
42600 DATA "Appointments (A)"
42650 DATA "Calculator (C)"
42800 DATA "Quit (Q)"
42850 REM --- Memo Menu ---
42900 DATA 9, "Enter Memo (E)"
42950 DATA "Change Text (C)"
43000 DATA "Print Memo (P)"
43050 DATA "Save Memo (S)"
43100 DATA "Retrieve Memo(R)"
43150 DATA "Delete Memo (D)"
43200 DATA "List Memos (L)"
43250 DATA "Erase Buffer (O)"
43300 DATA "Quit (Q)"
43350 REM --- File Cards ---
      etc...
```

As shown, lines 6210-6550 search through the DATA statements for the appropriate menu information. The READ statements at lines 6300 and 6400 work just like the INPUT statement. The only difference is that a READ statement takes its input


from DATA statements instead of the keyboard. Each time a READ statement is encountered the next data element is accepted. The RESTORE instruction at line 6100 initializes the DATA statements so that the next READ statement will take the very first data element in the list.

Lines 5950-6050 print any errors that have occurred above the menu between asterisks. Note how the main menu below puts an error message in ME\$ if an invalid choice is made. ME\$ can also be assigned a value from one of the subroutines called.

```
2110 REM *** MAIN
      MENU ***
2130 REM Call the MENU
      GENERATOR to display
      options and get CH$
2140 OF=1 : GOSUB 5600
2145 IF (CH$="W") THEN
      GOSUB 2800 : GOTO 2140
2150 IF (CH$="F") THEN
      GOSUB 3850 : GOTO 2140
2155 IF (CH$="A") THEN
      GOSUB 27900 : GOTO 2140
2180 IF (CH$="Q") THEN
      GOTO 2200
2190 ME$="Choice not on menu"
2195 GOTO 2140 : REM Loop
      ended with the quit selection
2200 END
```

Finally, I made line 2140 display the options and obtain a selection. It simply calls the menu generator to do its dirty work. Notice that before it does this, it must give OF (offset) a value. The menu generator refers to OF to find the correct menu.

So from now on, if you ever want to add another menu to DeskMaster, all you have to do is enter the options in the DATA statements at the end of the program and write a menu routine that calls the menu generator and then switches control to the appropriate subroutine. And, oh yes, you must write some subroutines for it to call.

Next month I'll talk about the memo-writer, which is one of the functions from the menu. 

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Home, Hearth And Computing

Those young eyes that used to be tuned to the TV in so many households each night are now tuning into another program—computing literacy

by Anita Seelig

A year and a half ago, Ted Ehrlich of Wood-Ridge, N.J., decided to computerize his office, which is located in a downstairs corner of his suburban home. The usual small business concerns—the need to increase profits and improve efficiency—were behind his decision to purchase an Apple. But there was also another motive that guided his course. “I always had it in the back of my mind,” Ehrlich says, “that I would get my two children involved with the machine.”

Before he bought the system—an Apple II with one disk drive, a printer and an NEC monitor—Ehrlich got his two children, a 12-year-old son and an 11-year-old daughter, used to the idea of having a computer in the house. “The kids knew it was coming home,” Ehrlich, a transportation consultant, remembers. “And they knew they would be able to use it.”

At first, the children became addicted gamesters, curiously adventuring through the variety of action disks that came with the hardware. But as Ehrlich began to work with the computer and his children, the kids warmed to the other possibilities of personal computing.

“The children are very eager to work with the system if there is an achievable result,” he says. “For in-

stance, my kids love to use the printer. So I taught them how to make the printer print their names out. That kind of activity, one that results in a tangible conclusion, they enjoy learning.” And he adds: “The key to the whole thing with young people is that they are not afraid of the machines. They have absolutely no fear of making the thing run right. To them the computer is as non-threatening as a pop-up toaster.”

Scenes like this are being repeated in more and more households across the nation. Parents who want their children to become computing literate—that is, to feel comfortable and adept at computing—are bringing home personal computers in ever-increasing numbers and whetting their children’s interest in electronic technology. In addition to that, parents who use computers at the office are bringing them home for job-related reasons, only to find that their children naturally gravitate toward the machines. But however the introduction is made, computer-literacy training in the home is becoming a fact of family life in the 1980s.

Not leading the charge

One of the main reasons for this phenomenon is a desire on the part of parents to augment their children’s education. Many parents feel that, indeed, they are being forced to teach their children about, and with, personal computing, because they can’t

rely on their school systems to do it for them. And statistics bear this out—schools are simply not leading the charge for computer literacy.

Only 15,000 of the 100,000 elementary and secondary schools nationwide have computing in the curriculum, according to a recent survey by Market Data Retrieval Inc. Further, of those who do have computers, only a few have enough to satisfy student demand. And even when they do have an adequate supply, many parents are concerned—and probably rightly so—about the quality of the computer education that their children are receiving.

“The public school system is perceived on the whole as being pretty bad,” says Wendy Peterson, marketing director at Edu-Ware Services Inc. of Agoura, Calif., one of the three largest educational software firms. “And these days parents want some control over what their children are learning.” Peterson says that parents are taking a more active role in their children’s educations, and that role extends to computing.

For many parents, then, bringing a personal computer home is the first real step in developing a child’s interest in computing. But after the machine is safely situated in the house, how do parents go about the task of teaching the children?

Most first-time computer buyers dig into the best available literature they can find. All hardware systems

Anita Seelig, a Dallas-based freelance writer, does a great deal of coverage on personal computers.

Wendy Peterson, marketing director at Edu-Ware Services Inc., one of the three largest educational software firms, says that as parents take more control over what their children are learning, they push for more computer education in the schools.



come with an owner's manual, a booklet of instructions on the operation of the computer, and often a programming language book, usually BASIC. Computer stores also stock additional books which cover advanced topics like graphics, or other computing languages.

Dr. Charles Anderson, director of the Applied Math and Physical Sciences Group at RCA's research laboratory in Princeton, N.J., used a combination of books and hands-on experimentation to teach his 21-year-old son, Charles W., how to use the RCA VIP computer four years ago. Charles W. is presently a computer science major at Tufts University. "We both learned about computing by taking turns using the machine and studying the programming manuals," Anderson says.

After watching his father and older brother learn to use the VIP, Steven Anderson, who was then 12, also began trying his hand at the keyboard. But he had trouble mastering the primitive code that the RCA machine operated on, so Anderson bought Steven an Atari 800. "I bought the Atari for Steven because

he's more comfortable with BASIC," Anderson says. "He's just so-so with the VIP machine language, and I thought the Atari would be easier for him." Steven seems to have settled comfortably with the Atari. "He sometimes uses it for games, but not always," his father says. "One time he ran a program overnight on it to calculate Pi."

While there are numerous books that are designed to help teach computing, more often magazines, with their snappier graphics and easier reading style, are the key to opening the door to computing for kids.

"Two of my children learned BASIC from a magazine," says Bill Barncord, a data-processing manager in suburban Dallas, Texas. "I copied the instructions for both of them out of the magazine, and they were able to learn it from there."

When Barncord brought his Apple computer home not long ago, he decided to surprise his five children, ages 7 to 17, and not prepare them for the new machine in the house. As he opened the box slowly and took out the computer piece by piece, he explained to his captivated audience

what each bit of hardware and software was used for. The youngsters recognized the television-like screen, but they didn't know what "video monitor" meant. They thought the keyboard looked a lot like a typewriter, but there wasn't any place to put paper. Even stranger to them was the small black envelope that held something called a floppy disk.

Barncord turned on the machine and slipped the lifeless floppy disk into its drive. As the computer loaded the program, all eyes were focused on the screen, as if waiting for the pot to boil. Finally, the small blinking cursor signaled all was ready. When Barncord touched the keys, words and visuals magically began to appear on the video monitor. As each took a turn at the machine, the children became hooked on the Apple computer. Before long, two of his children were following instructions in magazines and even writing programs.

A wide assortment of software is also available to serve as an aid in developing home computer literacy. Edu-Ware, for example, packages its products for both school and home use, but company spokespersons note that educational software for schools is quite different from the programs prepared for families.

"For schools we prepare a set of instructions for the teacher to use with the program," Edu-Ware's Peterson says, "and we prepare accompanying materials like workbooks for the student to use. On the other hand, we think of the family as one single unit. We figure all members of the family will learn the program together. We don't have to prepare separate programs for the parents and children." Edu-Ware markets its software for Apple and Atari computers, and is planning packages for the IBM Personal Computer.

Still another alternative that some parents depend on to help teach their children about computers is the user



Ted Ehrlich's daughter Judy first became an addicted gamer when Ted brought home an Apple II, but then she warmed to the possibilities of programming on the machine.

"If a parent is creative enough, the computer's versatility can be used to capture the imagination of almost any child."

COMING OF AGE ON LOON POND

They all looked at me anxiously, wondering what my decision would be. My wife had rented a cottage on Loon Pond in Maine for two weeks in August, and the only question left to decide was what to bring along.

We had made lists and lists and had begun to eliminate things one by one. The car was small and couldn't hold everything everybody wanted to take with them.

Of course, there were certain mandatory items—Dad's fishing equipment, Dad's old inner tube, Dad's snorkeling stuff—on which there could be no compromising, as well as some patently ridiculous things like extra blankets.

From situations such as this, kids learn the art of negotiation very early. They also learn to band together to hold out for an item they all want to take. I never dreamed it would be our new personal computer. But that was the one thing that each of them included on their "must take" lists.

We had vacationed at this cottage before and had subsequently gotten to know several families in the area. Most of them had children, and ours looked forward to playing with them every summer.

This year, though, was different. This year, in our youngsters' minds, they were one up in vacation equipment. They were going to bring the computer and do some major showing off, figuring that no one else up there would have one.

I asked them what, specifically, they were going to do with it up there, and they gave some varied and interesting answers. One wanted to play Scarfman; another wanted to play a form of computer school with her friends where she could teach them some programming steps for a "small fee." The third one, though, was a little more creative. He thought it would be a marvelous idea to map out the Maine pond on the video screen and so keep track of his entire summer-long fishing career.

The plan was simple. Whenever he caught a fish, he would put his program into the computer and enter all of the data it called for—such things as the type of fish, the time of day, the weather, and what he was fishing with at the time. In this way, he figured, he could get an idea of where the fish lived, or "hung out."

"We could make the program so that it will tell us where to fish when it's cloudy out," he said.

Hmmm. Select "cloudy" off a program menu and the computer tells you to fish at spot number four because that worked before when it was cloudy. Dumb, but what if it worked?

"Then it could tell us what lures worked the other times, too, you know," he added.

"OK, OK," I said, "maybe you have a point."

Of course, he did have a point. So instead of rejecting the practicality of the idea, I suggested that his plan might work better with a larger data base—if everyone on the pond chipped in with information.

"I can ask all the other kids everything, too, when they catch a fish," he chirped, getting excited.

Then suddenly I realized what my son was really trying to tell me. The true meaning of what he was saying didn't have anything to do with the fish at Loon Pond at all. He was telling me that he had achieved a working understanding of what a computer can do. He knew now that it could store information of this type, arrange it with programming commands and serve it up at a moment's notice.

So the decision was made. We would bring the computer. But something else then had to go. The dog, maybe? So again we convened a family meeting to settle once and for all our family priorities. My youngest was the first to speak.

"Dad," he said, "if we bring the 'puter, what about the printer?"

Oh, well, I figured, I could always hire a trailer.

—Edwin Hutchins

group. User groups are basically computer clubs that focus on a particular brand of computer or type of software, and education or computer literacy is becoming an essential ingredient in user group offerings.

The Barncords, for example, are members of a Dallas club called Apple Core, which they found through a local computer retailer. Apple Core has a wide schedule of classroom sessions in addition to the more common software "flea markets" and program problem-solving.

"We give beginning classes in BASIC," says Barncord, who is the treasurer of Apple Core, "and we have Pascal sessions for learning that language. We also have advanced Apple classes, and an Epson group for people with Epson printers."

With computer literacy for children recently taking on new importance, Texas Instruments has launched a computer club targeted directly at children in the 8 to 15 age group. Dubbed The Advantage Club, TI calls it an awareness program for youngsters. The club holds classes to teach kids the fundamentals of computing and programming. Members receive T-shirts and quarterly newsletters.

Although children over 8 would seem to be the prime age group interested in computers, some parents have found that even younger children like to play with the machines. One computer salesman went so far as to buy a portable Texas Instruments home computer for his 3-year-old daughter. "Before she got the machine, her attention span, in general, was very short," he says. "But after only a little while with the computer, she played with it for a long time. And her attention span for everything has gotten longer and longer. She's even gotten to where she tries to take it down off the shelf by herself."

Some children do not catch on quite as quickly as this 3-year-old, but if a parent is creative enough, the

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13.3	200	200	—	—	—	—
15	—	—	180	180	150	—
16.4	—	—	200	200	164	—
Enhanced	10	—	—	—	100	—
Expanded Print (Double Width)	Yes	Yes	Yes	Yes	Yes	Yes
Dot Addressable Graphics (Dot/in., H/V)	60/72	60/72	75/72	75/72	72/72	72/72
Max. Line Width (in.)	8.0	13.2	8.0	13.2	13.2	—
Audible Alarm	Opt.	Opt.	Opt.	Opt.	Yes	Yes
Out-of-Paper Sense	Yes	Yes	Yes	Yes	Yes	Yes
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"Children have no fear of using a computer. To them it's as non-threatening as a pop-up toaster."

computer's versatility can be used to capture the imagination of almost any child. Ed Wells, an engineering aide at Texas Instruments, for instance, added a voice synthesizer to his machine to enrapture his 9-year-old son.

"I've written learning programs for him like a reading and spelling package," Wells says. "And with the voice synthesizer, the computer will talk to him and ask him to spell a word. This greatly raises the level of his enjoyment with the computer.

"I've also taught him LOGO, a simple language for kids. He can understand it pretty well and likes the challenge it provides. He's learning how to think things out logically. For example, in one game he builds a sky-

scraper and knows he has to have brick and cement and start with a foundation. I think this will help him in the future because he's learning to approach problems in a methodical manner."

Kids and computers: a given


The ease with which children take to personal computers is almost a given. The advantages of a child using a machine, experts feel, are threefold: The child can learn about sophisticated concepts early in life, without a great deal of prodding; he can play games that expand his knowledge and are also enjoyable; and he gets a leg up on the computing knowledge he will most surely need when he joins the work force 10 or 15 years from now.

A recent television commercial best sets the tone of this position. It starts with actor Dick Cavett explaining the usefulness of the Apple computer as an educational tool for children. He then turns to a young boy sitting next to him who is absorbed in the machine.

"What are you doing?" Cavett asks.

"I'm calculating an investment program in stocks based on the rises and falls in the market over the past five years," he announces.

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"Want to know who will win the World Series?" the boy asks as the lights fade. 

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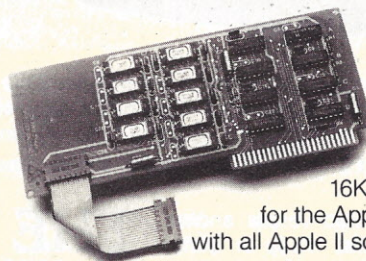
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SPECIAL REPORT

"The day when you suddenly find that you don't have any money, that's the day when you have to start looking at computing."

BIG FOUR ACCOUNTING

(continued from page 112)

function, the ultimate goal is control. The same is true, to a certain extent, of payroll packages—that and enormous savings in time and energy.

From hours to minutes

For years, small businesses had to rely on monotonous, time-consuming and error-prone manual payroll systems. They paid a legion of clerks, bookkeepers and accountants to keep records, tally pay rates, calculate a half-dozen or so deductions and then write checks, audit them and finally distribute them. Now that can all be done in minutes by computer.

Equally important, a payroll

program must be secure. For most employees and business managers, payroll information is the most confidential financial information a company possesses. Yet there must be easy-to-follow audit trails, so a business owner or his accountant can be sure that each employee gets what he deserves. Providing security is thus one of the most important features of a good payroll package. In addition to that, though, it should:

- Accommodate not only the number of employees on the present payroll, but any increase anticipated in the foreseeable future. (This includes the total number employed during a given calendar year for which files must be maintained for year-end tax reports.)

- Accommodate the number of deduction fields required for all tax deductions, disability, health or life insurance, savings plans, charitable contributions, union dues, etc.

- Print out statements to accompany each paycheck showing deductions for the current payroll period and year-to-date.

- Provide payroll journals for each pay period which may be easily scrutinized for accuracy.

- Provide summary information on a monthly, quarterly and annual basis which will allow for the preparation of all tax, insurance, union or like reports.

- Provide analyses of salary and wage expenses for multiple general ledger accounts, and do so by department, profit or cost center, or job number, if required.

- Provide individual records for each employee that include vacation and sick days taken.

- Accommodate multiple bases for pay such as hourly, weekly, etc.

- Record overtime pay separately from regular pay and provide reports on overtime pay by employee, department or other basis.

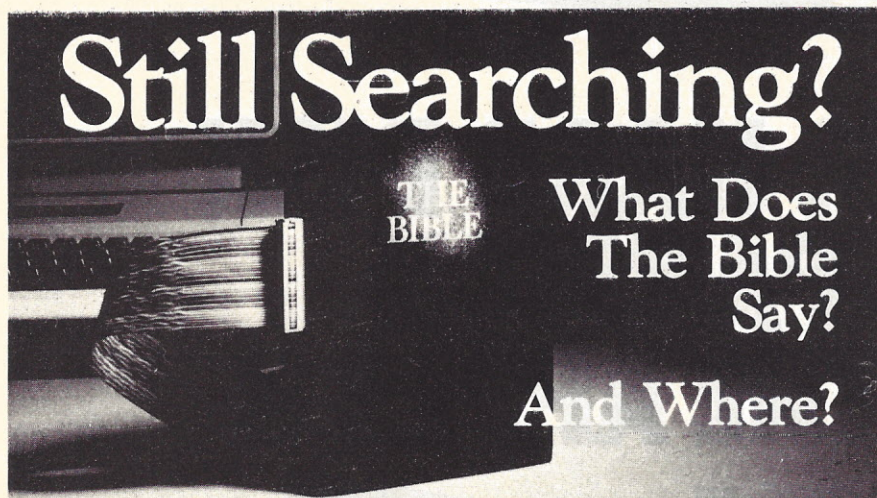
- Retain data which is constant for each payroll so that only variable data and changes must be entered for each pay period.

- Be integrated with the general ledger system.

Not all Big Four accounting software packages will have all these features—not in general ledger, not in accounts receivable, not in accounts payable, not in payroll. All will be different; all will have pluses and minuses, but many will also offer exclusive features, including some which are normally found only on larger machines.

Indeed, virtually every software distributor has something that's the best, or the most or the only one around.

Check them out, and somewhere in there you're almost sure to find the package that's best for you.



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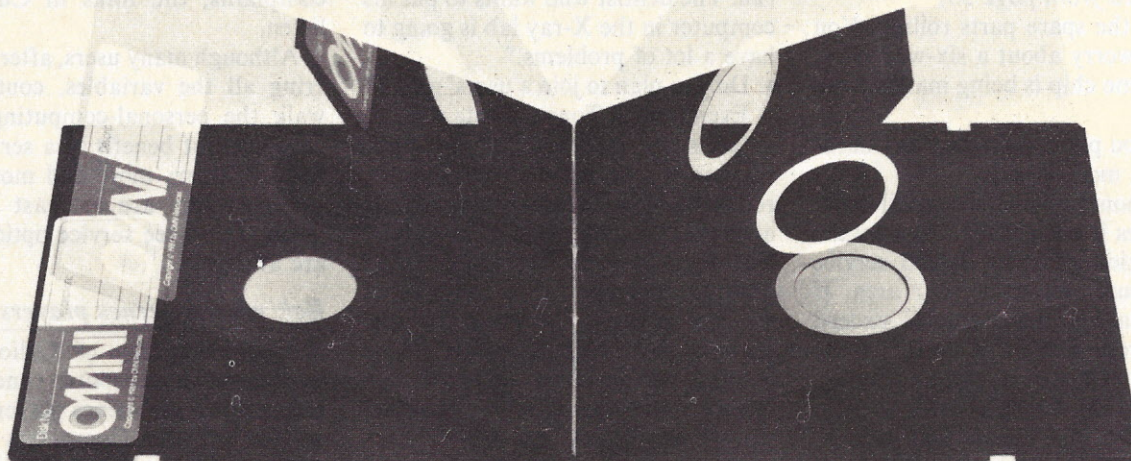
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“There eventually may be a ‘Computer Midas’ on your block, even though circuit boards are trickier to repair than mufflers.”

SERVICING YOUR SYSTEM

(continued from page 55)

keeping the spare parts rolling. You needn't worry about a six-week wait while some chip is being mailed from Osaka.

- Are you planning to buy any hardware via mail order?

The money you save on mail-order purchases is quite often offset by the aggravation of being denied service at computer stores in your area. If your total purchase doesn't exceed \$3000, your best bet is to pay for the vendor's extended warranty offering, and then do business with a local retail store that honors that guarantee. If you're purchasing dozens of computers through the mail, however, it would be advisable to investigate one of the third-party maintenance companies and forget about the extended warranty.

This is one area where it's easy to get caught with your pants down. "Even if you bought a computer from us," notes Aurelio Muniz, a Computerland service manager in New York City, "we would probably deny you support for any mail-order peripherals that you purchase."

- Are you willing to modify the computer environment to avoid various service support problems?

It may seem a little incongruous, but by careful interior decorating of your personal-computer site, you may be able to ensure that your new system is up and running for longer periods without service.

"A lot of the problems involved in computer repair have absolutely nothing to do with the equipment itself," asserts Radio Shack's Fletcher. "The environment is sometimes responsible. For example, it's a good idea to have dedicated power sources for the computer gear. You certainly don't want to have an arc-welding machine on the same circuit, because every time somebody turns it on you're likely to have brownouts, and you'll lose data." Fletcher adds that "the computer's proximity to

some things make it impossible to run. The dentist who wants to put his computer in the X-ray lab is going to have a lot of problems."

- Do you plan to join a users' group?

Even though Tony Cerreta will tell a few scare stories about fast-buck service departments in the metropolitan New York area, he quickly adds that "it's very hard to disguise a bad reputation in the Apple user-group community. One function of our user group is to prevent the neophyte from getting ripped off. There are 550 people in our club who can advise new members on technical problems. When my Apple goes down, for instance, a close friend of mine, who also serves on the club's board of directors, repairs it himself, at no cost to me. In most user groups, regardless of vendor, there are engineers who will answer technical questions and perhaps even do some servicing."

The computing tightrope

User groups also play an indirect role in helping the vendors evaluate their authorized dealerships. "Apple is very, very scrupulous about the way they lease and renew these contracts for dealerships," Cerreta emphasizes.

His corollary is that when BAUG complains, the folks in Cupertino listen.

Although many users, after considering all the variables, continue to walk the personal-computing tightrope without benefit of a service net beneath them, more and more computer owners are at least investigating the three service options that are available.

Behind-the-scenes players

With the exception of Radio Shack, most personal-computer vendors are only behind-the-scenes players in the service business. Computers sold by Apple, NEC and IBM, for example, are serviced by authorized dealers, not the manufacturer. Radio Shack, on the other hand, takes direct responsibility for servicing a whopping 98 percent of its TRS-80 product line.

Radio Shack is also one of the few personal-computer manufacturers that offers on-site service. Radio Shack's ground rules for travel time and mileage are comparable to those set down by third-party maintenance organizations: If the user is within 150 miles of a Radio Shack Service Center and his system is worth at



John Norton, a Computer Factory service manager in New York City, says that his firm prefers to repair individual components rather than whole computer boards. He describes it as just as quick and less costly for the customer.

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BUSINESS

John T. Harnett, director of planning and development at TRW Customer Service Division, foresees the day when personal-computing service contracts will unquestionably emphasize on-site repairs rather than customer carry-in.



least \$3000, that user qualifies for on-site service. However, remote surcharges are tacked on as soon as the service technician has traveled 50 miles.

The TRS-80 buyer can purchase a service contract from any of the 6000 Radio Shacks nationwide. The company charges an annual 12 percent of purchase price for a carry-in service contract, and that can turn out to be quite economical depending on the product. A carry-in contract for the TRS-80 Model III with one disk drive would cost approximately \$240. But if you want on-site service (at 20 percent of list price) for the top-of-the-line TRS-80 Model 16, the annual service fee will run you roughly \$1000.

The vendor/dealer marriage

The other manufacturers, who decided not to incur the expense of building hundreds of corporate-owned service centers, were left with two choices: rely on authorized dealers or negotiate agreements with independent maintenance organizations—third-party service firms—such as Sorbus or TRW.

IBM has resolutely stuck to a game plan which calls for authorized dealers to provide most of the service work performed on ailing computer systems. Apple also followed this path exclusively until this past June when the firm signed a third-party servicing agreement with RCA Service of Cherry Hill, N.J. Both Apple and IBM, though, take responsibility for what is sometimes termed “Level II” servicing. In other words, they’ve built regional service facilities to handle the technical problems that can’t be solved at Level I shops such as Computerland, Computer Factory or Sears. Apple has six Level II repair facilities in the U.S. and one in Canada; IBM does its sophisticated maintenance work at 15 product centers nationwide.

Some business users are nonplussed by the fact that you can’t get

on-site service for the IBM Personal Computer, and that on-site coverage for Apple has been difficult to find. But most users have simply gotten used to remedying problems by toting the computer to a Level I facility. Jeanette Maher, an IBM spokeswoman, notes that many customers are within minutes of an authorized Computerland or Sears store, equipped with its own service department.

And Aaron L. Woods, national service manager at NEC Home Electronics U.S.A. Inc., speaks proudly of his company’s network of more than 100 authorized service centers. “Our average time for testing and repair is just under one hour,” says Woods, “and most repairs can be provided within 48 hours.” Woods adds that NEC, which currently offers only carry-in service contracts, is negotiating an agreement with a third-party company that will enable NEC users to get on-site attention.

It’s possible that these third-party maintenance organizations will transform the personal-computer servicing business within a year or two (more on them later). But for the moment, most users feel comfortable with the vendor/dealer alliance. So if you’re willing to carry your hardware in for servicing, and assuming that your local store has proven itself to be a morally upright institution, how widely will the prices vary?

Computation and cogitation

A one-year service contract on the Apple II Plus (covering CPU and all Apple brand connected peripherals) is \$225. The Apple III coverage is \$395 annually. A carry-in service contract for the IBM Personal Computer is a wee bit steeper: Its nine-month warranty extension option, which rounds out your first year of ownership after the 90-day warranty expires, costs \$330.50, and that covers CPU, keyboard, one disk drive, monochrome display terminal and dot-matrix printer.

The NEC carry-in prices, just like

Radio Shack’s, require both computation and cogitation: Depending on the product being serviced, 12 percent of list price can be either a bargain or a burden.

The prices just cited are typical “ballpark” figures for personal computer repairs performed by authorized dealers. The manufacturers set the prices and percentages on all the service contracts issued at their authorized dealers. But what if you want a service contract on, say, a Vector from a store that’s primarily an Apple-authorized dealership? One option is to sign a pact with that store based on the retailer’s terms, not the manufacturer’s. But you’ll find that retail stores’ prices are nearly identical to vendors’ terms in most cases.

A need for caution

If you’ve done business with them before—and have found them to be honest, sympathetic people—you’ll probably receive good service from your local retailers. But if you’re inking an agreement with a store simply because it’s located near your home or business, be cautious and consider this advice:

- If you want a one-year contract, it’s pretty standard for the store to charge 12 percent-of-purchase-price for carry-in and 18 to 20 percent for on-site (if the latter is even available). Don’t let them snow you with a “2 percent per month” (24 percent annual) clause.
- Shop around for a store that makes contractual provisions for response time. Some stores will guarantee a response time of four hours.
- Ask the service manager if “board swapping” is the common diagnostic procedure. Swapping entire boards can get you up and running faster than conducting a painstaking search for what’s wrong, and that’s desirable if you’re under contract. If you’re not under contract, however, and are merely waiting in line for repairs, board swapping can get expensive.

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“Try to erase mentally what the friendly computer salesman told you about his merchandise being more reliable than a Maytag.”

“We try to go down to component level rather than just swapping boards,” says John Norton, a Computer Factory service manager in New York City. “In many cases, it’s just as quick and a lot less costly to the customer.”

- Seek out the store’s technical support people to see how amiable and helpful they really are. If they’re dedicated, they’ll concur with Bruce Tucker, a New York technical services manager: “Customer loyalty is my primary concern. The people who buy from the neighborhood retailer want the reassurance that this is the place they can come back to if there’s a service problem.”

- Inquire about the store’s policy concerning emergencies. Most in-store service departments will move you to the head of the line if there’s a dire emergency.

Party of the third part

If you can’t get satisfaction from your retailer and your manufacturer fails you, there is yet another alternative: third-party maintenance. Sorbus and TRW are the two biggest names in this sector of the computer industry.

A third-party service organization negotiates a very long, detailed contract, called a client agreement, with each manufacturer so that the arrangement offered to the end-user can be relatively simple and straightforward. Ed Gilman, TRW Customer Service Division’s manager of business operations, is grateful for the scope of the client agreements. “So many things are spelled out in our contract with the manufacturer, such as supply of parts, number of service locations, and the curriculum for the training of TRW technicians,” he says. Gilman adds that the agreement gives TRW “the rights to use the vendor’s schematics. We also get a license to use whatever proprietary and confidential information they have so we can manage the performance of maintenance.”

The most striking similarity between TRW and Sorbus is reputation: Both organizations have excellent track records in mainframe/minicomputer maintenance, and their service people are extremely experienced.

TRW has more than 200 computer service locations with a total of 2800 service people employed; Sorbus has 160 service centers and 1200 field engineers. Sorbus has a national-average response time of two hours, and TRW’s national-average response time for all products—not just computer-related ones—is four hours.

Where they differ

Lest you think that Sorbus and TRW are nearly identical twins, they do part company on a number of issues. TRW feels that the carry-in service contract is an endangered species; Sorbus thinks that carry-in will continue to flourish. “As more and more businesses get integrally tied into the personal computer,” says TRW’s John Harnett, “it’s going to become very difficult for these companies to stop what they’re doing to carry machines in. We foresee very little demand for carry-in coverage.” Sorbus’ Venable disagrees with that forecast, maintaining that “there are times when the economics of the situation justify living without the machine for one business day. We’re expanding our menu of services to cover the middle ground, too. We think that departmental managers at big corporations want the flexibility offered by our van pick-up and delivery service.”

TRW Customer Service readily disseminates information about which vendors they’re working with, while Sorbus prefers that the user call its toll-free number to see if the hardware in question is covered by a Sorbus client agreement. TRW, by the way, services Commodore Business Machines, Diablo 630 printers, Vector Graphic personal computers,

and various products from Hazeltine, NEC and TeleVideo, to name a few.

Both firms are beginning to make moves that will hurry the day when the “corner computer fix-it shop” will be common. TRW is opening a local service outlet in Dallas before Thanksgiving, and Sorbus is making plans to test the Midas or Aamco guy-on-the-corner strategy. “Just think back to the last time your TV set broke,” says Venable. “You probably looked in the Yellow Pages and took it to the repair shop closest to home. Sorbus believes that the personal-computer market is going to move in that direction. It’s the ‘dry-cleaning’ philosophy. You drop your suit off at the most convenient place and then it’s taken someplace else for the actual dry cleaning. It’s this same approach—applied to personal computers—that we’re considering. There will be a convenient drop-off point and a centralized service facility.”

TRW Customer Service, Sorbus and other third-party maintenance outfits don’t always agree on strategy, but they all share a long-term commitment to personal-computer servicing. And since service is their only business, these organizations are confident enough to say, “Let the (silicon) chips fall where they may!”

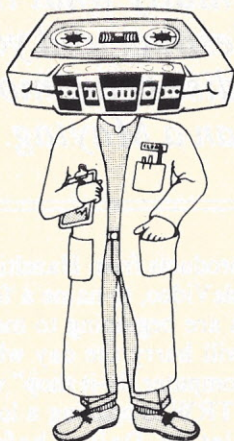
Once bitten, twice shy

So there you have it—the three service options available to every proud owner of a personal computer. Well, make that four options if you honestly feel that no amount of dire warnings can convince you to pay for a service contract. After all, Picasso never paid a nickel for life insurance and he made it into his nineties, right?

There are still many who agree with David Brin, a San Diego-based novelist, who elected to “go naked” and avoid any type of service contract. Brin, a nominee for this year’s John W. Campbell Award, which is

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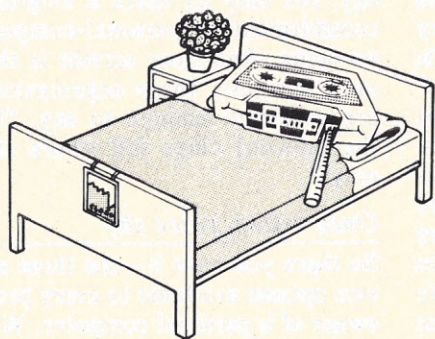
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CIRCLE 80

BUSINESS

given for the best new science-fiction novel, has encountered only one problem in the one and a half years that he has owned his 48k Apple II. "One of my disk drives blew," Brin says, "but since I originally had two disk drives I then limped along with only one. I've also found that if you establish a good relationship with your local computer store—buy your Epson ribbons and paper from them, for instance—they'll often do the little nitpicky repair things for free. And not paying for labor can add up to significant savings."

A tale of horror

But for those less inclined to risk computer inconvenience, here's one more horror story to bolster your way of thinking: Robert F., 28, is an Anaheim, Calif.-based writer who's been very happy with his 56k Vector VIP. He loves the disk drive that came with it, and the extra one he purchased. But the printer Robert bought wasn't the Sprint 3, which is Vector's system printer and the one the company heartily recommends.

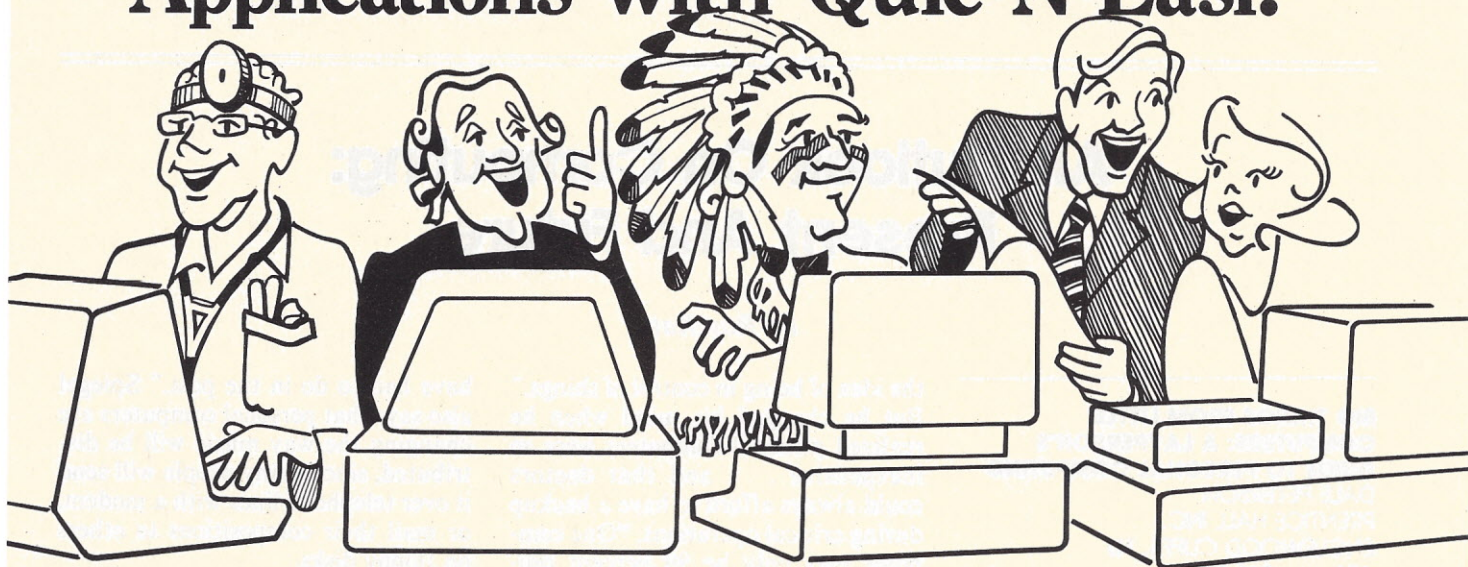
"The day my printer went on the fritz I wasn't seeing red—I was seeing white," Robert sighs. "There was a very dignified, white-haired business executive who needed a double-spaced printout of the speech I had written for him. And that morning, after I ran off one page of hard copy, there was a sharp snapping noise and the printer just came to a complete stop. I was frantic, so I hauled out my electric typewriter and began re-typing the speech based on my hand-scrawled notes. And I was still seeing white because I had to use Liquid Paper to correct my typos. About halfway through this nightmare, I realized that I'd never finish the re-type before this guy's plane took off.

"I don't want to name the vendor," Robert continues, "because it's not a case of awful hardware. It's a case of my own pig-headedness in not looking around for a service contract."

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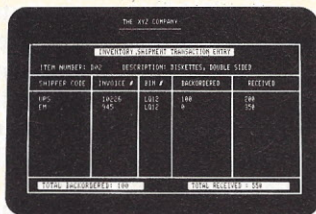
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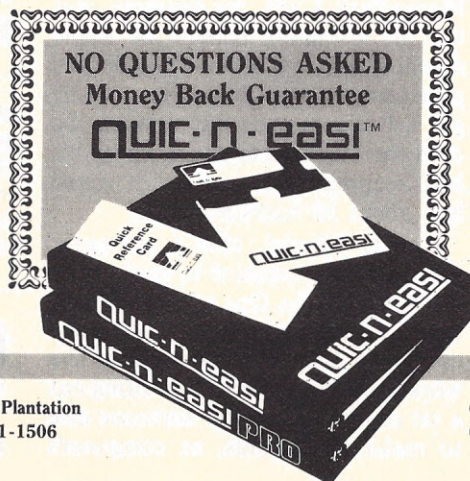
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An Outlook On Computing: Present And Future

by Roy Katz

BIG THINGS FROM LITTLE COMPUTERS: A LAYPERSON'S GUIDE TO PERSONAL COMPUTING

DALE PETERSON
PRENTICE HALL INC.
ENGLEWOOD CLIFFS, NJ
179 pp., \$12.95

Dr. Michael Rumelt, a St. Louis eye surgeon, uses his Apple II to monitor the growth of glaucoma in his patients' eyes. He puts a photograph of one patient's eye on top of a digitizing, or graphics, tablet and then traces the optic nerve and its inner depressions onto the tablet. This gives him a more accurate idea of the size of the glaucoma, and enables him to measure any variations of it in the eye over time.

To author Peterson, Rumelt sums up the benefits of using a personal computer in this manner: "I'm sure that in some universities there are very expensive computerized systems to do what I'm doing. But here is an opportunity for the average physician to use an off-the-shelf set-up at a reasonable cost to more precisely follow his patients."

In addition, the author describes why another physician, Dr. William New, a professor of anesthesiology at Stanford University Medical Center, uses his Commodore PET personal computer as standard equipment to monitor patients' conditions in operating rooms and intensive care units. New says that while he studied electrical engineering in college, he, like most doctors, originally "hated computers, or at least did not trust them enough to use them because anesthesiologists are obsessed with

the idea of being in control of things." But he changed his mind when he realized personal computers were so inexpensive . . . and that doctors could always afford to have a backup during critical operations. "One computer may only be 99 percent reliable," New says, "but that same computer with a backup twin suddenly gives you 99.99 percent reliability. And, of course, it's portable, and thus easy to interchange almost immediately with a backup."

These computer applications in medicine, however interesting, are only two of dozens of unconventional applications described in detail in *Big Things from Little Computers*. Peterson discusses a variety of unique uses for personal computers in education, art, music and business, in the home and by the physically handicapped.

Another interesting part of the book is the section that contains extensive comments by personal-computer users about some of their computer successes and problems. Bill Powers, owner of a small store in Menlo Park, Calif., for example, says that he originally bought an Apple machine thinking all he could do was play games with it. However, once he got a business program running, he used the machine to cut down on his bookkeeping, and realized it saved him about 30 hours a month.

Laurie Spiegel, also a computer user, puts her machine to work when she writes music. One reason she uses the computer, she says, is that she can "work like a painter does on the work itself, rather than by writing out a set of instructions for someone else to make the sounds, as composers

have had to do in the past." Spiegel also says that personal computers are changing the way music will be distributed, since many people will send it over telephone lines with a modem, or mail their compositions to others on floppy disks.

David Beheman, another musician, sees the future of music and computers in a different way. "I want to see technology shortcut the process that musicians have had to go through, in some cultures, of spending years practicing before they could enjoy themselves," he says. "And I believe that's one direction this new technology is taking us."

The book overflows with the author's enthusiasm for his subject matter as he conducts a mock dialogue with his readers. It is clear that *Big Things from Little Computers* is not a how-to book, but rather a resource book of better personal-computing ideas and applications that can be implemented with a little effort and imagination.

A tip heard on The Street

THE INVESTOR'S COMPUTER HANDBOOK

ROD E. PACKER
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BOOK REVIEWS

That was a good philosophy, but it would have been even better if Rogers had had a personal computer to make it work in practice. Author Packer does have such a machine, and he uses it as an aid to investing because he believes "anything that helps you apply risk management will, in theory, bring you a better return on your capital."

In *The Investor's Computer Handbook*, the author also cites several reasons why computer users become interested in the stock market. "Investing in securities," he says, "and specifically the stock market, is attractive because, like computers, it offers novelty. The market is ever changing, perpetually new. It is also a game that surpasses in complexity and intrigue the most elaborate new adventure programs and requires far more strategy than 'look aheads' in computer chess. Better yet, investing holds the promise of helping to put bread on the table."

One area the author concentrates on is helping investors choose the proper software to meet their specific requirements. He describes various programs that run from modified routine business programs and general financial analysis packages to complex portfolio evaluators, data-base management programs and charting programs. But the author reminds readers that they will find no reliable correlation between a program's cost and its future profitability in applied trading.

Computer hardware is another area covered in detail by *The Investor's Computer Handbook*. One of the author's most important recommendations is that the serious investor purchase a color TV monitor for use with financial software. He maintains that despite its high initial cost, a color monitor will pay dividends many times over because color can help the investor read charts more quickly and fully. He also suggests buying good graphics software because very often a pie diagram will

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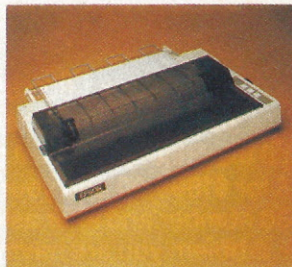
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BOOK REVIEWS

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The book will interest the growing number of investors looking to computerize one or more parts of their portfolio management functions. It explains the advantages and limits of using a computer to monitor investments, and how to make better investment decisions. The author says that a personal computer should be regarded as a "junior partner" with which investors can "share decision making at critical junctures."

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INDUSTRIAL MARKETING AND SALES MANAGEMENT IN THE COMPUTER AGE

ROBERT F. KELLEHER
CBI PUBLISHING COMPANY
BOSTON, MA
170 pp., \$19.95

With the cost of each in-person sales call rapidly approaching \$100, marketing and sales managers are looking for ways to get more sales from each marketing dollar spent. Therefore, many marketing executives have finally turned to personal computers for help. In *Industrial Marketing and Sales Management*, author Kelleher describes several methods of using computers to increase marketing productivity and, hence, profits.

Kelleher, a well-known marketing expert and president of Advanced Industrial Marketing Systems Inc., writes that today too many marketing and sales managers still do not understand computers. "Somewhere during the past 25 years," he says, "an important turn in the road was missed. Marketing and sales managers, uncomfortable around computers, either underemploy them, or do

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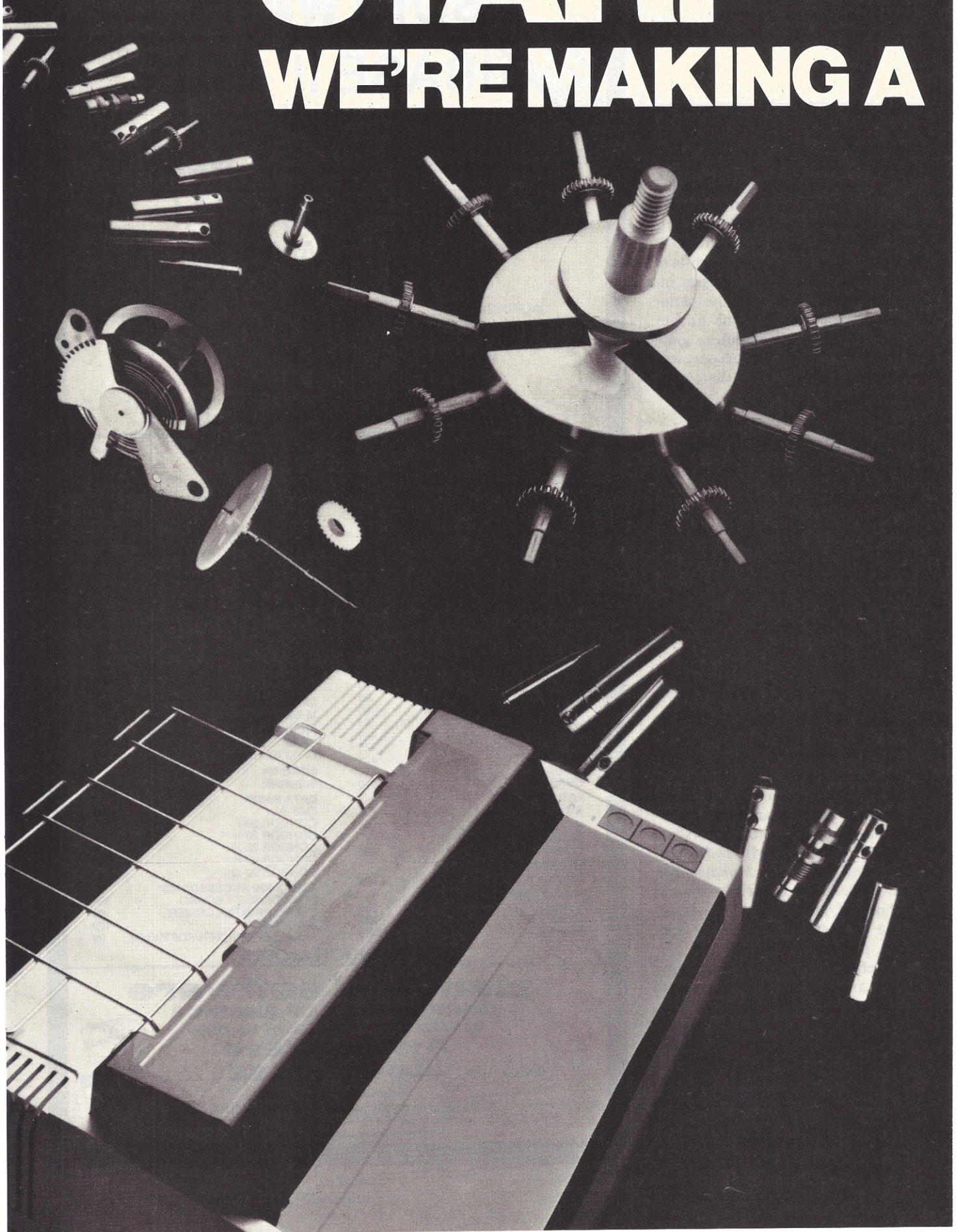
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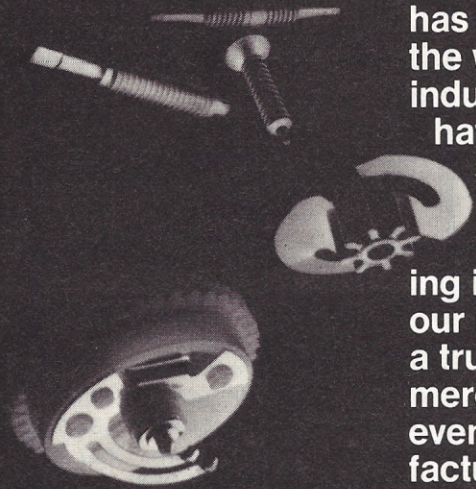
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not use them at all in important industrial marketing and sales management applications.

Kelleher maintains that industrial marketing and sales managers simply do not understand the nature of the information they require to improve their productivity. It is not more information that is needed, but rather "the right information." The right information, Kelleher says, is "real information, and real information is new information. Apparent information is in plentiful supply and can be comfortably reassuring. Real information is relatively scarce, can be difficult to get, and is profoundly disquieting because real information provides insight into what has not been known. Its presence can put an end to the pleasure of basking in reflected glories." Kelleher thus recommends the development of both Materials Requirements Planning (MRP) and Marketing Applications Programs (MAPs).

The goal of Kelleher's Materials Requirements Program is to use computers to "rationalize production management and inventory control functions in manufacturing companies." In other words, MRP better enables decision makers to manage the problems that usually develop between "order getting" and "order filling" functions.

Likewise, Kelleher's series of Marketing Applications Programs are designed to help managers stay on top of what is happening in the field and to generate new sales leads. He describes 15 such programs, including those for monthly reports that detail the number of sales quotes given out; customer review reports according to Standard Industrial Classification (SIC) code numbers; and prospect reports by customer, SIC, size and revenue codes. While Kelleher does not give specific programming guidelines, he does provide examples of MAP reports, leaving it to the reader's MIS department and pro-

(continued on page 169)

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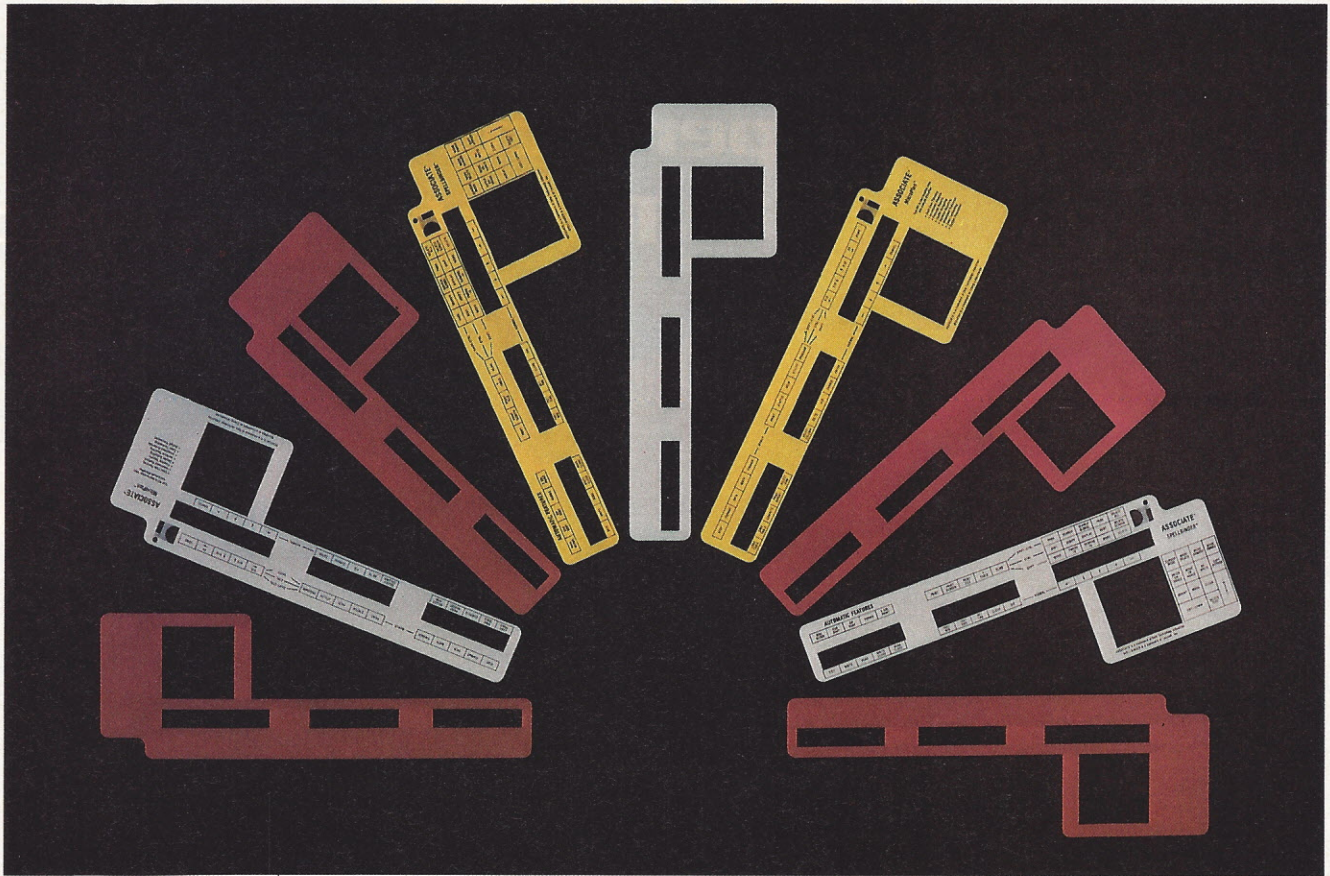
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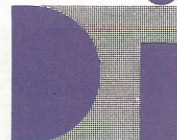
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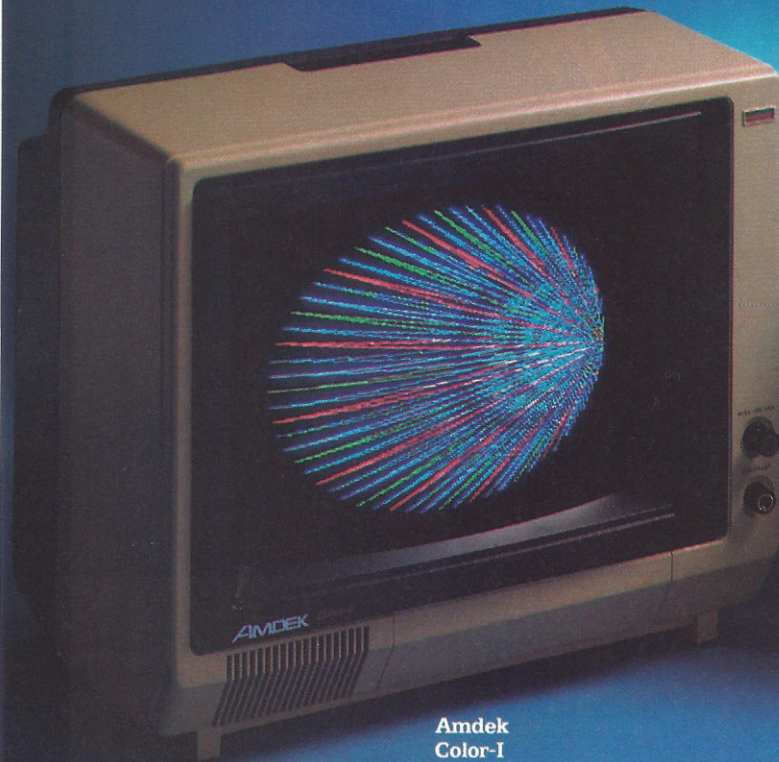
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BOOK REVIEWS

(continued from page 164)

grammers to develop their own specific MAPs.

In discussing the use of these MAPs, Kelleher points out that their primary goal is to "make managers aware of something that has been hidden in the past for lack of real information. MAPs provide real information that can be used to influence results not otherwise obtainable." Kelleher adds, however: "It is a good rule to keep MAPs simple and run many of them, rather than design complicated MAPs that may burden machine capabilities."

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THE TRS-80 MEANS BUSINESS

TED G. LEWIS
JOHN WILEY & SONS, INC.
NEW YORK, NY
194 pp., \$12.95

If readers are seriously considering purchasing a TRS-80 Microcomputer, they should first read Ted Lewis' book, *The TRS-80 Means Business*. The book is in depth, yet highly understandable, and explains exactly what the machines can and cannot do.

While the basic focus concerns the TRS-80 Model II, much of the book's material is applicable to other personal computers such as the Apple and PET. *The TRS-80 Means Business* concentrates on the business applications of these systems, and is written for small-business owners and professionals such as doctors and lawyers. The author attempts to show these people how personal computers can save them time and money.

Lewis presents a variety of case studies of businesses and professional practices that have made profitable use of personal computers to control their payrolls and inventories. He

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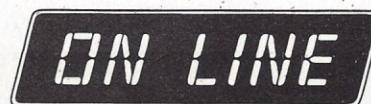
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also presents a special detailed chapter on the various methods of creative financing to consider before buying a personal computer. This chapter alone is well worth the price of the book, and should be shown to the company accountant before purchasing any capital asset.

Lewis also describes the advantages and disadvantages of purchasing off-the-shelf software and custom programs. In summarizing the differences, he notes: "Custom software is likely to cost more, partly because it is customized and partly because of inaccurate estimates made at the outset of the project."

The TRS-80 Means Business is a good book to read for both general background and specific advice on the capabilities of the TRS-80. Lewis has taken pains to be detailed but not overly technical, and he explains everything clearly and precisely. For example, in describing the operating speed of the TRS-80 Lewis writes: "Generally speaking, the MIPS rate (millions of instructions per second) of a CPU is a relative measure of speed. A good analogy is the EPA gasoline mileage rating of automobiles. While this is an ideal rating, the actual mileage varies with different conditions and drivers."

While this book is not a how-to guide on programming, the author has included several "ready-to-run subroutines" that will help readers use their TRS-80s for accounts payable, inventory control and as powerful filing cabinets.

A book like this is essential to new personal-computer users who are trying to cut through the storm of words about personal computers, and get accurate information. While they are handy machines and excellent corporate tools, personal computers have their limitations. The case studies presented in this book can serve as a guide for first-time users trying to decide what kind of system configuration is best for them.

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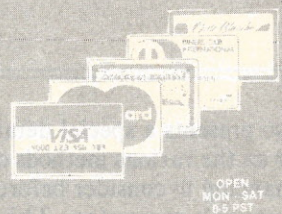
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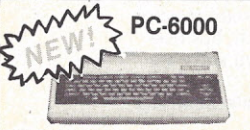
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BOOK REVIEWS

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BITS 'N BYTES ABOUT COMPUTING A COMPUTER LITERACY PRIMER

RACHELLE S. HELLER
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174 pp., \$17.95

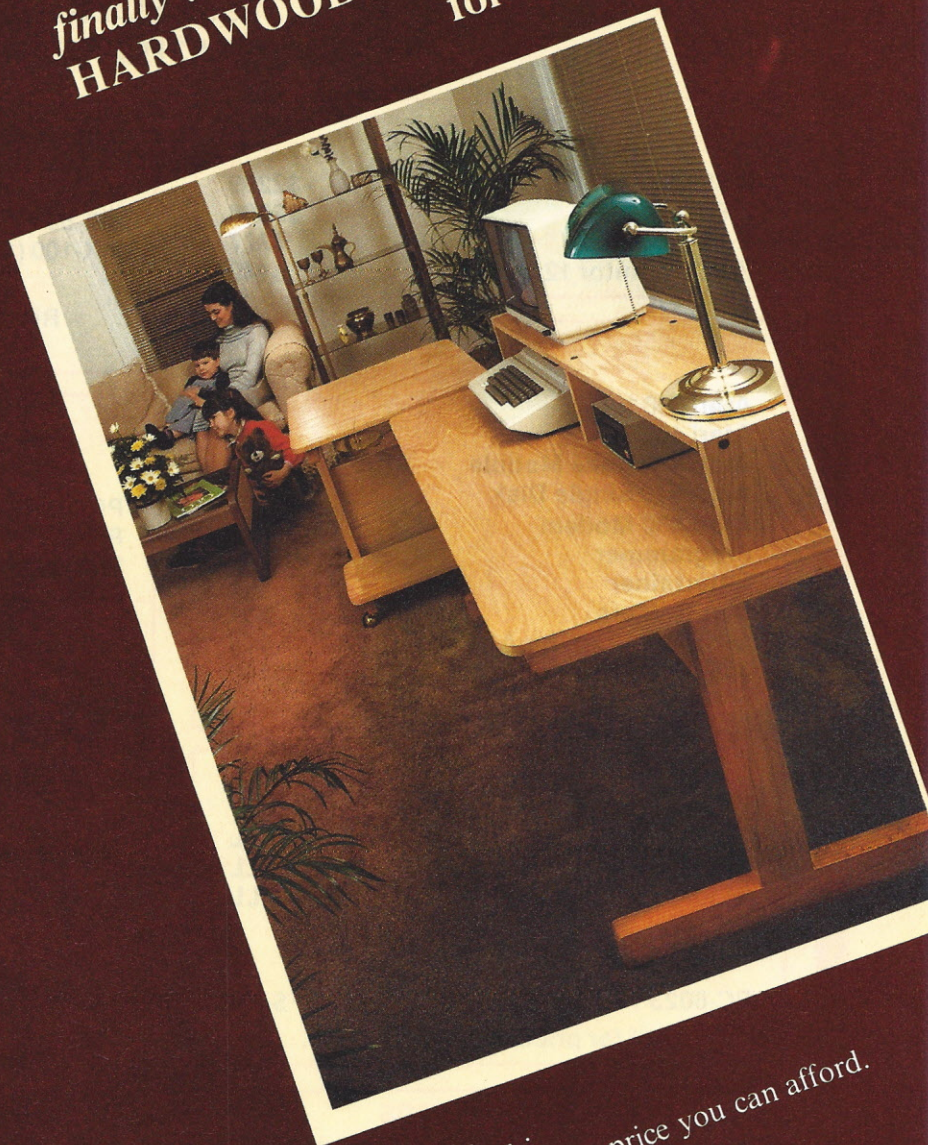
Bits 'n Bytes About Computing is an example of good intentions gone bad. Rachelle Heller and C. Dianne Martin attempted to write a guide for teachers about teaching computer basics to elementary school children. Unfortunately, its execution is faulty because it offers only a superficial and unimaginative explanation of the history of computers, how and why they work, and what the future holds for computers.

The major problem with this book is that it is written on a third- or fourth-grade reading level which will bore, if not insult, adult readers and teachers. The book could be read aloud word for word to students to teach them all about computers, but as any good teacher will tell you, that is not the best approach. *Bits 'n Bytes About Computing* can still be salvaged, though, if it is revised slightly. With revisions it would make a good, introductory elementary-school computer textbook.

The book's main assets are its extensive lists of additional references and resources at the end of each chapter. These lists are comprehensive and up-to-date, and include not only magazines and books, but slides and movies available for classroom reviewing. In addition, the "Teacher's corner" projects are good, and if readers add a little extra thought of their own, they can make them even better and more interesting to students.



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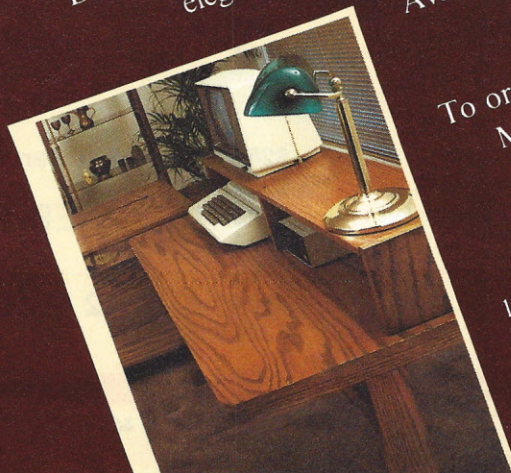
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Three Ways To Outbid The Enemy

by Thomas Throop

For the moderately good bridge player who wishes to improve his bidding technique, Bob Wolff, a member of the Dallas Aces bridge team, has designed three sets of bidding lessons for the Texas Instruments 99/4 personal computer. You, as South, select the bids with your cards while the computer provides the bids for your partner, North, and your East-West opponents.

When it is your turn to bid you have three chances to come up with the best or recommended bid. If you don't select the bid in three choices, the program will tell you the preferred bid, provide you with an explanation of this bid, and tell you the bids your partner makes and those by East-West. Explanations of certain bidding conventions may also be displayed on request.

Each set of bidding lessons is available on a separate computer disk. The subjects covered in the first disk are opening bids, overcalls, choice of suits, suit versus NT and game bidding. The second disk contains adequate trump suit, asking bids, source of tricks, Backwood and Gerber conventions and cue bidding. Finally, the topics included in the third disk are discipline, partnership trust, preemptive bids, takeout bids and high-level judgment.

Let's look at a few examples of the bidding problems presented in these lessons, along with the explanation for the correct bid. First, here is a hand from the lesson on "game bidding" on the first disk. Your cards are:

S KJ7
H AJT83
D KJ
C J63

Your partner opens the bidding with 1 diamond, and you respond with 1 heart. Your partner then rebids 1 spade. But now there is a problem. You have a game, but where? Four spades, 4 hearts, 5 diamonds or 3 no-trump may be the right final contract, depending on your partner's holding. How do you proceed?

The answer is to make a fourth suit forcing bid as a temporizing maneuver. This will give your partner a chance to rebid one of his suits, show a preference for hearts or clubs, or show a balanced hand by bidding NT.

One of the topics in the second disk, which concerns

itself with slam bidding, is "asking bids." Suppose you hold:

S OT54
H Q
D K84
C QJ532


The bidding has proceeded 1 spade by your partner, 2 diamonds by your right-hand opponent, 3 spades by you, and then 5 spades by your partner. What do you bid?

With this hand you bid 6 spades. After the opponents have overcalled a suit, a jump to five of a major by the opener or responder asks you to bid six if you have first- or second-round control of the opponents' suit. Lacking that control, you pass.

In some of the lessons you are given different hands for consideration in the same bidding situation. Here is an example from the lesson on "partnership trust," also on the third disk. Suppose your partner, North, bids 1 heart, East overcalls 2 diamonds, North passes, and East passes. What do you bid with the following hands?

a.) S AQT73		d.) S AQT73
H J5		H KJ53
D Q3	c.) S AQ732	D 3
C QJ82	H KJ5	C AJ2
b.) S AQT732	D 3	e.) S AQ732
H 5	C QJ32	H KJ5
D 3		D A2
C QJT32		C A33

With (a) you should double. You have a poor hand on offense, no fit with your partner, and a doubleton in the enemy suit. With (b) you should bid 5 spades. You have good playing strength, and your partner will have something in spades since he passed 5 diamonds. With (c) you should bid 5 hearts. Your fine heart support and your singleton diamond make this your hand. With (d) you should bid 6 hearts. Having a fit with your partner's hearts, the ace of spades, the ace of clubs, and only 1 diamond, you expect to make a slam. With (e) you should bid 6 diamonds. This cue bid shows first-round control of the enemy diamond suit and invites a grand slam.

For TI 99/4 computer owners these lessons provide an unusual opportunity to learn some of the bidding techniques proven so successful in world competition. 

Maryland-based Thomas Throop has been working with computers for 30 years, since the days of the Univac 1.

OUTLOOK

(continued from page 26)

it has the answer to both these problems, and feels that providing those answers to dealers will solve problems for users as well. Soft-Link president Reid Rutherford feels that the small-business user in particular will save money.

"If a small business purchases three or four accounting packages at \$600 each, and the programs aren't what the company needs," says Rutherford, "the business may end up with no useable software, a debt, and a sour taste in its mouth for computing in general. So Soft-Link decided to give the small business or individual an opportunity that never existed before—the ability to try out software on their own system."

It works like this. Soft-Link sells the dealer a package that the dealer can sell to the retail customer for \$49.95. (At that price dealers can probably afford lots of packages.) The customer, upon asking for a demonstration of a particular kind of software, is sold one of these lower priced package on a conditional basis. Upon reaching his

home or office, the user finds that the package he has for \$49.95 will do *almost* everything the whole package will, or more than enough for a full-scale demonstration. But the small part that the package won't do is critical—it won't, say, perform daily updates to the general ledger. Lacking this capability, the package is useless, except as a demonstration.

If, however, the user decides he wants to buy that particular package, all he needs to do is call the dealer back and tell him. The critical part of the program—the updates in our example—are on the disk, protected by encryption so the computer's operating system can't decipher it. The dealer, apprised of his customer's desire to purchase the software, calls Soft-Link and receives the key needed to unlock the critical code that makes the package fully operational. The dealer can then charge the customer's account the remaining cost of the package, or receive payment in any other conventional manner, before telling the user what the key phrase is.

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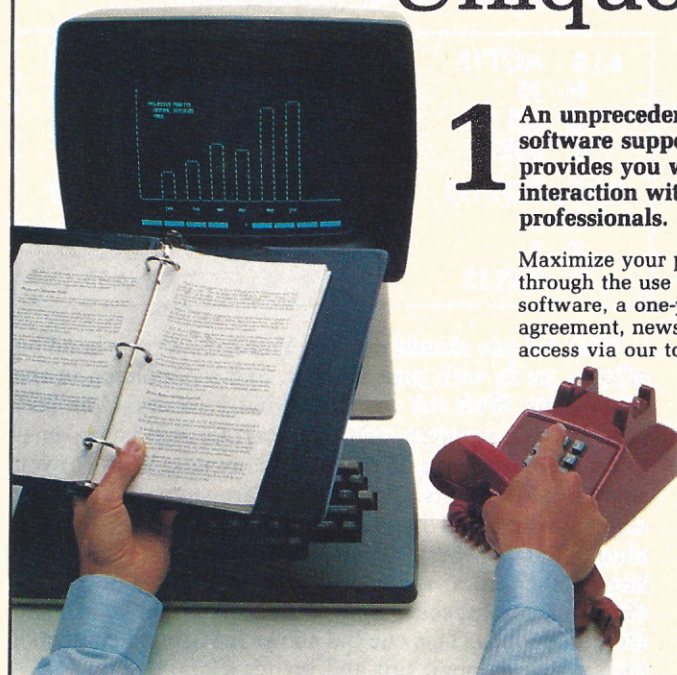
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OUTLOOK

Soft-Link currently has several such packages available and will be adding more, Rutherford says. Among those now available are: SuperCalc, from Sorcim; Spell-Guard, from Innovative Software Applications; Roots/M Plus, which traces genealogies, (useful to stock breeders) from CommSoft, and MicroPlan, a program from Chang Laboratories.

All these products run on CP/M machines. Soft-Link plans to increase its product line in the "near future" to address other operating systems.

"Soft-Link wants to give the business professional the flexibility to choose from several of the best programs available in each field, and to be able to rely on Soft-Link for all software requirements," Rutherford says.

Soft-Link software sells for \$49.95 in the locked configuration. Unlocked, the programs go for from \$200 to \$600. For more information contact Soft-Link, 161 South

San Antonio Road, Los Altos, CA, 94022; (415) 941-7553.

TI EXPANDS LEARNING CENTERS

Two new Texas Instruments Learning Centers have been opened in San Francisco and Santa Clara, Calif., further expanding TI's concept of bringing information on the use of electronic products to end users.

The opening of the two Bay Area Learning Centers was part of a special "Computer Literacy Week" during which educators, business people, students and others attended activities focusing on the importance of knowing how to use computers. Throughout the week, a special exhibit of historic electronic milestones was open to the public at the San Francisco Learning Center. The exhibit included the first silicon transistor, the first integrated circuit and the first "calculator on a chip."

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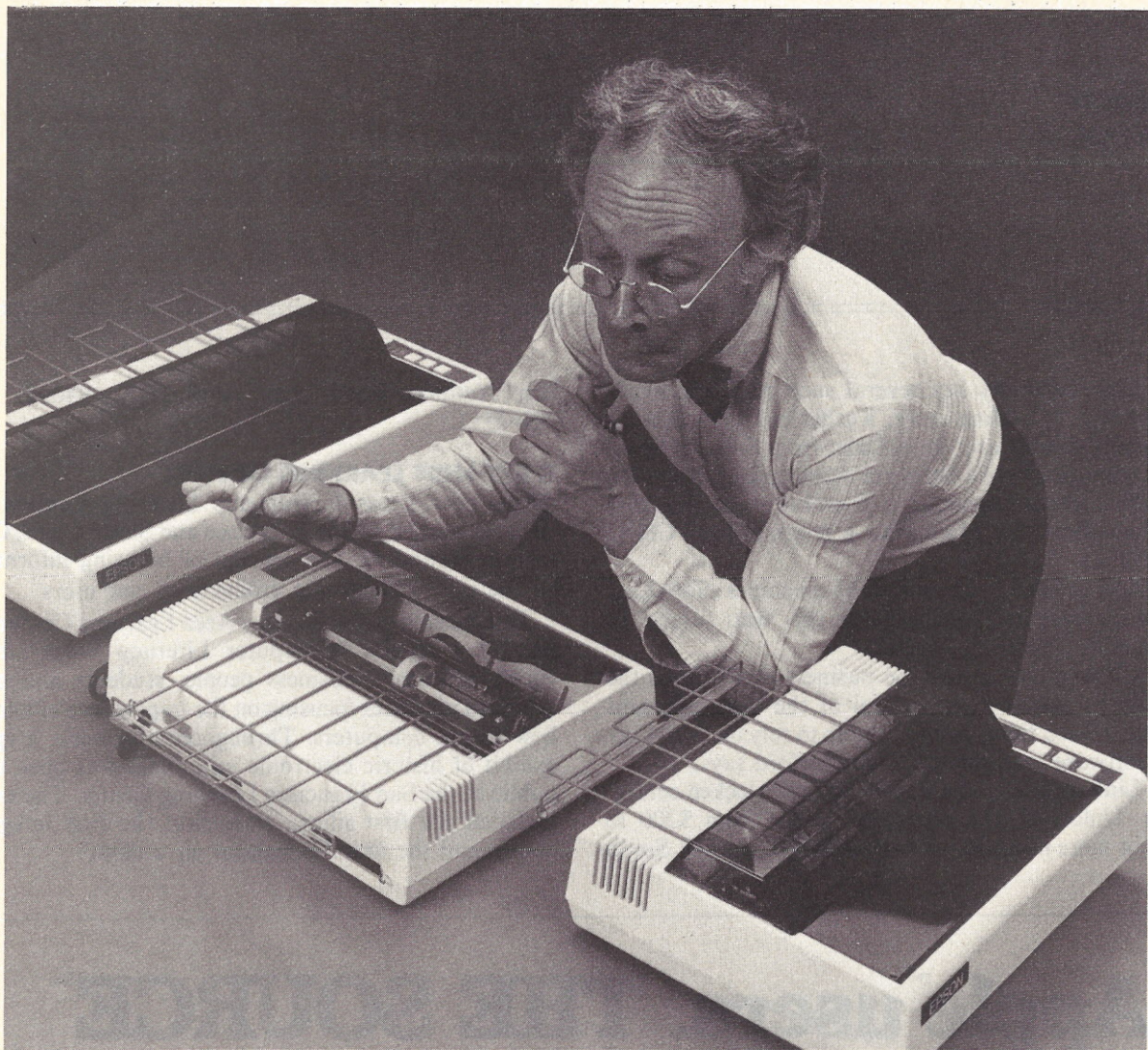
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The opening of the new Learning Centers follow the January opening of TI's first Learning Center at the Merchandise Mart in Chicago. Like the Chicago Learning Center, the two California centers offer a range of seminars, lectures, workshops, demonstrations and videotape courses about TI electronic products and their applications. Some of the educational services are free; others carry a nominal tuition. Books, manuals and literature for TI electronic products will be available.

Both Learning Centers feature exhibits of TI's line of DS990 commercial computer systems and software packages, as well as the TI-99/4A Home Computer; programmable, professional and business calculators; and electronic learning aids. The products are ready for a "hands-on" demonstration by visitors to the centers, with TI staffers available to answer any questions.

According to Charles Clough, vice president of corporate marketing at TI, "TI's Learning Centers provide a cost-effective way for TI to reach out directly to end users with in-depth product information and training. They

represent a significant innovation in marketing increasingly affordable, advanced electronic products."

RADIO SHACK AND NATIONAL SCIENCE FOUNDATION STRIVE TO EDUCATE

Radio Shack has announced an agreement with the National Science Foundation to provide computer equipment to institutions for use in education programs in science, mathematics and engineering. The agreement to provide the equipment is a result of the recently announced TRS-80 Educational Grants Program, sponsored by Tandy Corp.

The National Science Foundation, an independent agency of the U.S. government, will be awarding the computers as the equipment portion of projects it supports in the science education program.

"Educating citizens who are knowledgeable about how to use computers effectively is a key to improving our nation's productivity," says Dr. Dorothy Derringer, a Science Foundation program director. "The idea for this

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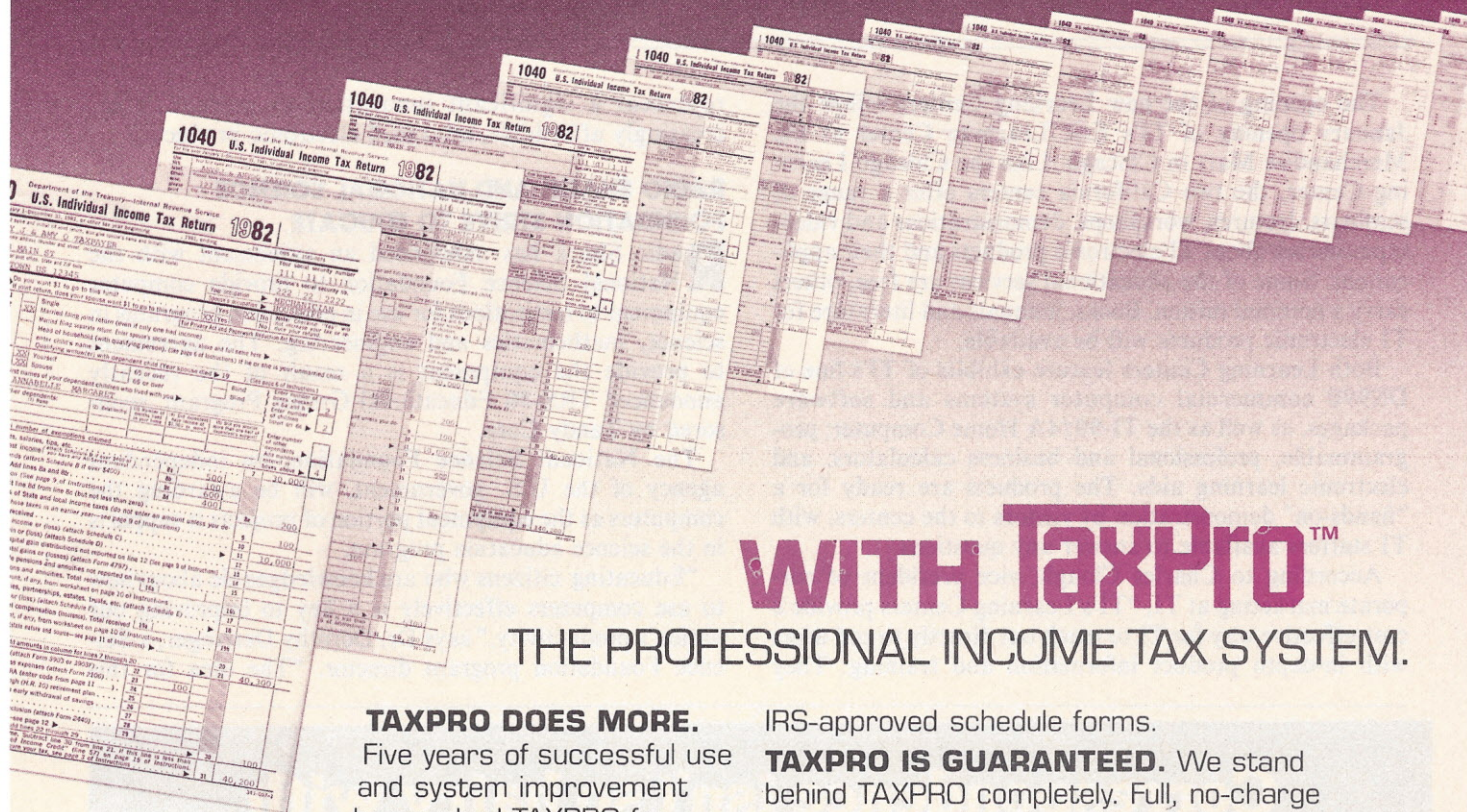


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OUTLOOK

effort in science and engineering education in computing has developed into what I believe is a model cooperative effort for government, industry and education. In this program, we will all be working together to address the educational challenge that is one of our nation's most important problems."

Charles Phillips, Radio Shack senior vice president, special markets, calls the program "a timely and important step in supporting the need for renewed emphasis on science education in this country." Phillips adds that "rather than simply giving out hardware, we want to support projects that have a meaningful plan for educational applications using that hardware."

THE NEW TECHNOLOGY MERGER: VIDEO AND COMPUTERS

It may seem impossible for us to imagine, but there was a time when video and computer technologies were separated by a yawning chasm that seemed at least as wide as the Grand Canyon, if not as deep. Today, though,

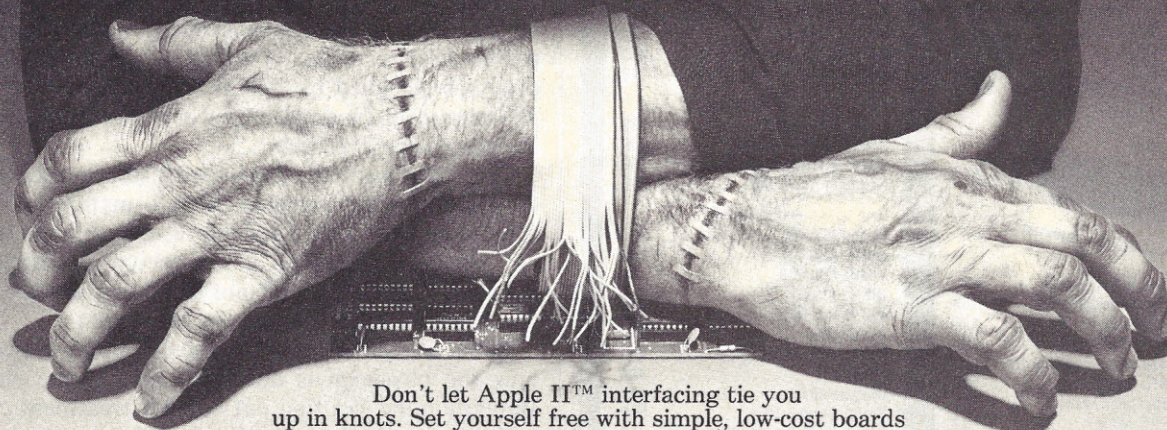
this isn't the case, as every personal computer, and most minicomputers and mainframes, use video for instant feedback.

What made that possible was the rapid advancement in the miniaturization of electronics. Complex electronic functions, graven in silicon, sell for less than the cost of a triple triode, a mainstay of the vacuum-tube era of electronics.

And the video/computer trend continues: These technologies are moving towards one another rapidly. Sound, practical reasons impel the marriage. Using video technology, computers can solve more problems than ever before—problems that require speed of response and larger mass-storage capability.

Time saving is a major motivator in today's attempts to make the computer an even closer partner of video technology. From the obvious advantage of large mass-storage capabilities through the use of video-cartridge recorders used as data-backup devices, to the less obvious, but probably more important, use of video for presenting

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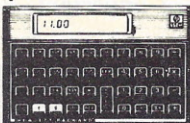
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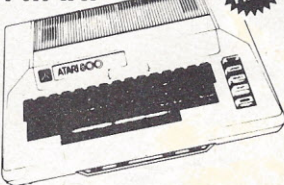
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CIRCLE 100

OUTLOOK

graphics to large audiences, video technology can save time for computer users.

Many a manager, for example, has probably wished that the beautiful bar chart he generated showing sales of widgets over the last quarter by territory could be shared with his superiors. It can, by using video technology properly.

When Monroe Systems for Business debuted its educational and occupational computers in New York last summer, the firm used large-screen projection television sets to tout the graphics capabilities of the machines. The educational computer has the video monitor built-in, because schools might have situations in which they would like to mix video and computer media in an instructional package.

Beyond the use of video for graphics, though, the main use of video and computers in the business world involves video disks that also have programming information stored on them. Such disks are often used for training.

WICAT Systems of Orem, Utah, made the first disk for McGraw-Hill in 1977. The program was called the Development of Living Things, a biology demonstration that was similar to a videotape. This disk had no programming, but at that time video disk players were not even available—they were introduced in December, 1978. The McGraw-Hill disk was later upgraded for computer-assisted instruction (CAI) by adding 2500 still frames and lab simulation.

Another use of video disks that involved a computer-assisted format was a continuing medical-educational presentation that also provided marketing benefits. The disk was designed by WICAT for SmithKline Corp., a pharmaceutical manufacturer in Philadelphia, for use by its international division.

Instead of using the usual case history presentation, the simulated patient presents the information to the physician. A patient history and lab results can then be obtained. The physician then has a choice of performing 25 diagnostic tests. At this point the doctor could call for an X-ray and it would appear on the screen.

While all this is going on, the computer keeps track of how the physician is doing, so that at the end of the simulation, he can find out how his treatment compared with the one prepared by the physicians at the University of Utah. Incidentally, when the physicians sign onto the simulation, they are asked a few questions about their specialty and how long they have been practicing medicine.

The program is currently in use in Canada, England, Holland, Belgium, Sweden, Germany and Italy.

Ford has also put Video/CAI to a training-related use. In 1979 the company was having diagnostic problems with its solid-state ignition system. The firm created a five-hour training course to fix the problem with Plato, a

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OUTLOOK

CAI program from Control Data (Minneapolis, Minn.), a video disk with an existing training tape and about 700 still frames, and a minicomputer.

The entire package was tested by Ford mechanics using three modes of instruction—CAI, simulation and an interactive job aid. With computerized record-keeping, the company found that 70 percent of all the systems reported as defective were actually good. Because of a time management situation, it was easier for the worker to simply replace the part without diagnosing the problem.

In another application, General Telephone and Electronics (GTE) is planning to use an Apple III, a Sony video disk, and the Telemet videotex system in conjunction with a research project for potential use by the American Medical Association. The disk will involve the storage and dissemination of health-care information.

IBM is also using video disks for CAI, point of sale for its new personal-computer line, and as a customer education program. The company feels that now that it's marketing the lower-priced items, it is more economical

to show a video disk at a customer support center than it is to make a personal sales call.

It all sounds wonderful, but there is a catch. The bottom-line cost of one of these programs is in the range of \$90,000 to \$200,000. So companies thinking of connecting a video disk with a personal computer for training should consider whether the distribution of students and the necessity of the task make the cost justifiable.

UNEMPLOYMENT THROUGH AUTOMATION?

While the premise behind the personal-computing movement is to make people more productive and increase their efficiency, there are other aspects of this high-technology industry that could aggravate the high unemployment present in this country and other countries around the world, if automation isn't handled right.

Massive introduction of computers and automation in all sectors of the world economy is increasingly being linked with growing joblessness, with an estimated 30

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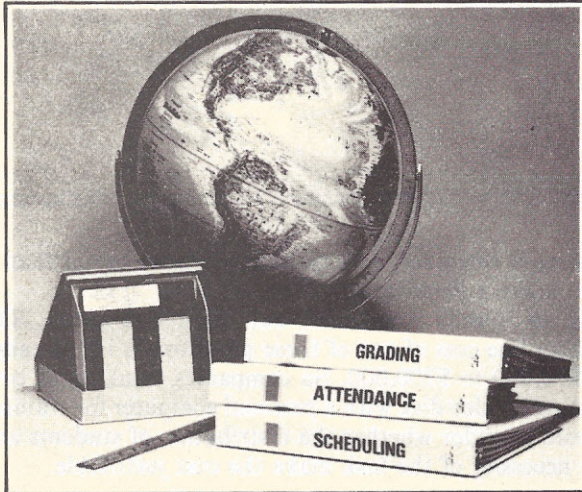
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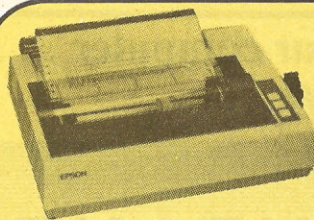


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OUTLOOK

million people now unemployed in the industrialized western world. Authorities in many countries are considering stricter controls on rate of automation and technology transfers during the 1980s and 1990s.

"These new attitudes surfaced recently at the Versailles Summit of western leaders, and are bound to lead to political inquiry and more trade protectionism," says Bohdan O. Szuprowicz, president of 21st Century Research in North Bergen, N.J., a high-technology and strategic trade research organization. "These measures will affect the growth of the computer industry and may flood the United States with masses of cheap programmers."

The research firm is embarking on a series of in-depth multiclient studies designed to look at these issues on behalf of computer industry suppliers, political action groups, trade unions, local and state governments, and computer users.

"Global Computerization, Productivity, and Unemployment Geopolitics" is the title of the basic study investigating computer-related unemployment. It will look at how different worker constituencies view the introduction of computers in their industries and what pressures they will apply in the future—to their managements and governments—if unemployment gets any worse.

"The Top 100 Computer Import Markets of the World" will rate all countries as computer hardware importers, and relate this factor to their ability to absorb the technology and the cost of the resulting unemployment.

"The Supersoftware Fund Project" will explore the trend to completely redesign the man-machine interface so it will "hide" the existence of computers within the workplace while increasing productivity of individual enterprise.

"Information Explosion or Data Pollution" will address the social, political, ethical and economic factors that are converging on computerization within countries with differing political systems. These factors and their effects on national security and personal freedom will also be addressed.

"Military Computer Markets of the World" will look at the role played by the military in various economies in supporting high-technology research and development that could not otherwise be justified.

"Southern Africa Computer Markets" will investigate the computerization of one of the least known parts of the world and an area rife with political tensions. The investigation will be based on the differing ideological, racial, social and economic conditions.

AN ALTERNATIVE TO YELLOW BLOBS AND ALIEN SPACESHIPS

Rubbing the last vestiges of sleep from their eyes, 10 Reager children crowd into the "clubhouse" to take their places in front of colorfully lighted video screens.

CIRCLE 107

But instead of watching hungry yellow blobs gobbling dots or alien spacecraft firing missiles, the children are learning the language of computers.

This scene was repeated in 24 cities across the country this summer, when thousands of eight- to 15-year-olds participated in Texas Instruments Computer Advantage Clubs. The clubs offered young people hands-on experience with the TI-994A personal computer.

Summer computer programs are not new. For several years, Computer Camps International has offered residential summer camps for children interested in computers. What sets TI's Computer Advantage Club apart, says the company, is its accessibility and affordability. For \$65 per child (\$50 for each additional family member), the club offered a computer awareness program that covered computer terminology; programming in two computer languages, TI LOGO and TI BASIC; and use of solid state software in music, education and arcade-quality entertainment. The sessions, held throughout the summer

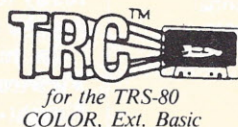
months, included two and a half hours of instruction per day for four days in an informal classroom setting.

In addition to the four-day computer awareness program, club membership provides a quarterly newsletter, a membership card and a club tee-shirt. Members' parents were also invited for one evening so they could learn how to help their children expand their computer skills.

TI's Education and Communication Center in Dallas, Texas, developed the curriculum and activity book for the program in conjunction with Computer Camps International. The activities were specifically designed for use with the TI-994A.

One of the languages taught, TI LOGO (the computer language for children), simplifies programming, builds basic computer skills, develops spatial relationship skills and strengthens hand/eye coordination. The TI-994A also provides color graphics, sound, music and speech to enhance a child's ability to interact with the machine and receive positive feedback.

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"The rapid advancement of technology has made practical knowledge of computers a virtual necessity," says Chuck Digate, director of The Computer Club Program for TI's Consumer Products Group. "Computers affect us from early childhood throughout our adult lives, and TI Computer Advantage Clubs provide opportunities for young people to take advantage of new electronics technology."

COMPUTER SURVIVES HEAD-ON AUTO COLLISION

Less than 10 minutes after the Sun Computer Store opened for business in Huntington Beach, Calif., it became the first drive-through computer store in the country.

David Graham, manager of the store, had just unlocked the front door when a late-model car came crashing through the plate-glass display window. In addition to causing several hundred dollars worth of damage, the incident proved an unscheduled "environmental test" for an Attache portable computer from Otrona Corp.

(Boulder, Colo.), which was displayed in the window.

"When the dust settled a little bit, I decided to run a check on the equipment that had been a part of the window display," Graham said. "One computer, an Apple II, was dead, but the Attache came right up when I plugged it in."

The machine was designed for above average wear-and-tear, says Otrona marketing director David Ridge, but "this goes somewhat beyond our anticipated worst-case usage."

DATA BASES IN THE NEWS

Affiliated Publications and Knight-Ridder Newspapers have signed an agreement looking toward the possible establishment of a Viewtron electronic information system in metropolitan Boston. Viewtron is a two-way electronic communications service that can be used to call up information on a TV screen, including the latest news, weather, sports and business data. The system is also transactional and can be used for in-home banking and shopping; airline, hotel and dining reservations; as well as for playing games and sending and receiving messages.

The information, which will be sent over telephone lines next year, can also be sent by cable television. If the results from the introduction are encouraging, Knight-Ridder and Affiliated will enter into a joint venture to market the service in the greater Boston area and eventually to all of Massachusetts. Plans also include marketing the service in Maine, New Hampshire and Vermont.

In mid-1983 Knight-Ridder and AT&T will offer the Viewtron business in some 5000 homes in south Florida. Knight-Ridder's subsidiary, Viewdata Corporation of America, will prepare all of the content for the data base, install and operate the computers, and be responsible for all areas of creative content. AT&T will supply the terminals and Southern Bell will supply the communications network. Both viewers and advertisers will be charged for the services.

In addition, Knight-Ridder recently announced an agreement with Capital Cities Communications to establish Viewtron systems in Fort Worth, Texas, and Kansas City, Mo.

Affiliated Publications publishes *The Boston Globe* and owns Affiliated Broadcasting, which owns and operates 10 radio stations located in Seattle, Wash.; Sacramento, Calif.; White Plains, N.Y.; Springfield, Mass.; and Jacksonville, Fla. Affiliated also owns 45 percent of McCaw Communications Companies, a cable television and radio common-carrier firm that operates in Alaska and Washington. Affiliated and McCaw have entered into a venture to purchase a cable television company in Oregon, and a microwave common carrier that services northern California and southern Oregon.

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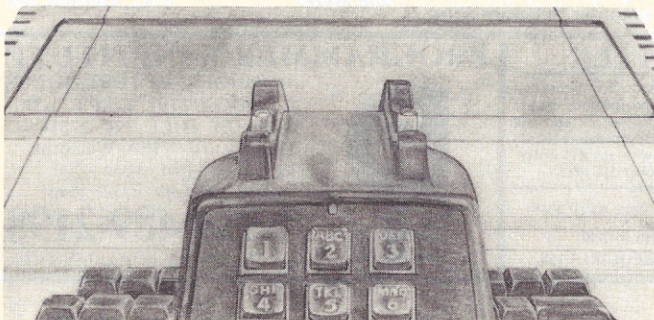
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CIRCLE 91

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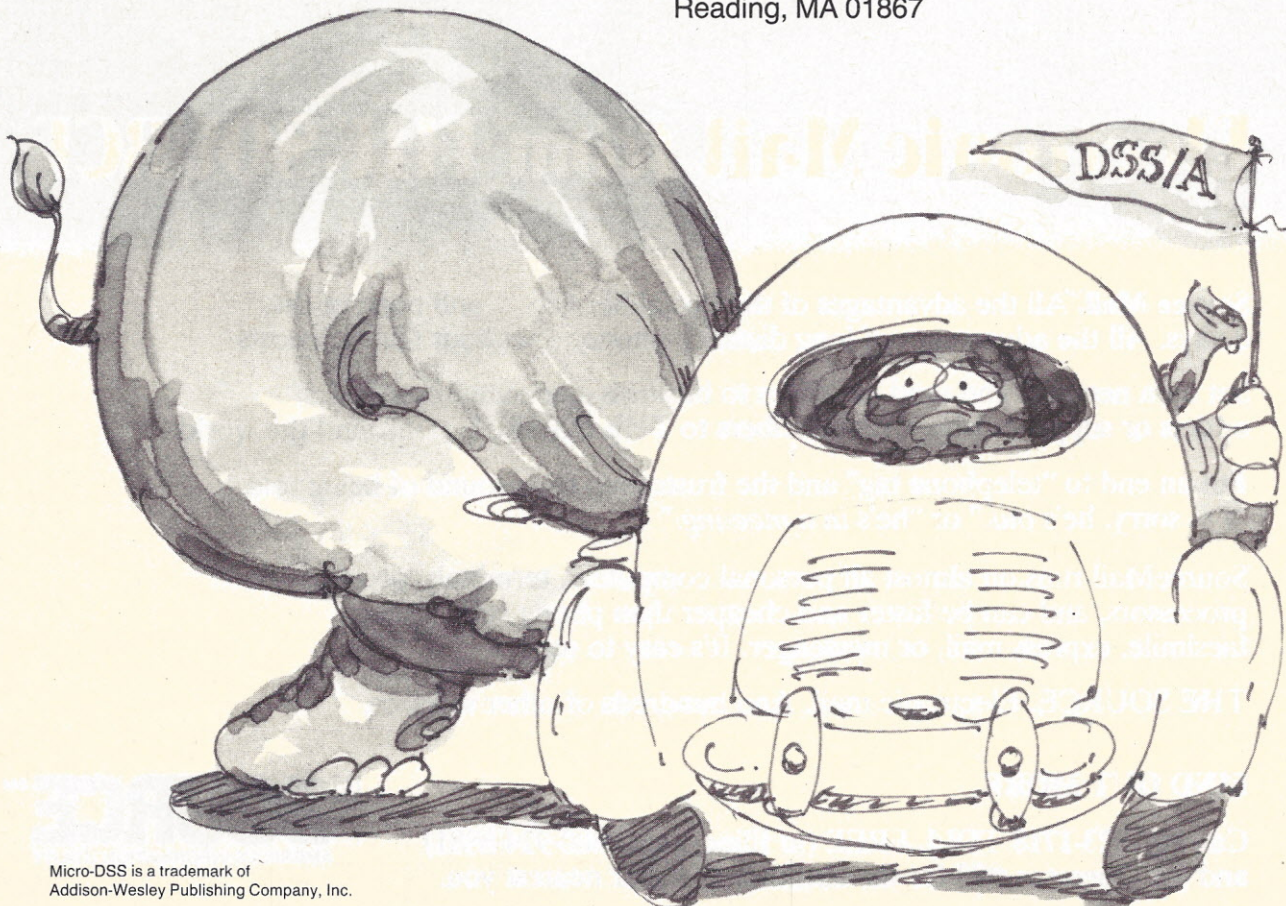
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OUTLOOK

Knight-Ridder publishes 33 daily newspapers, owns and operates four VHF television stations, and is in the cable television business. Moreover, the company is engaged in electronic distribution of commodity and financial news and market quotations, newsprint production, book publishing and selected computerized information-retrieval services.

HIGH LEVEL OF INTEREST REPORTED BY MAGAZINE SURVEY

A recent survey of 4000 teachers across all grade levels, conducted by *Instructor Magazine*, shows that while relatively few are using computers in their schools, a whopping majority have a high level of interest in personal computers as a teaching aid. The majority of respondents had some acquaintance with personal computers, though few claimed to be above average in computer skills.

The reason most do not use computers for instruction, they said, is lack of access. Almost half of those surveyed

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	TI940 CRT	1,795	173	96	65
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	TI787 Portable KSR, 120 CPS	2,845	273	152	102
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	ADM5 CRT Terminal	645	62	36	24
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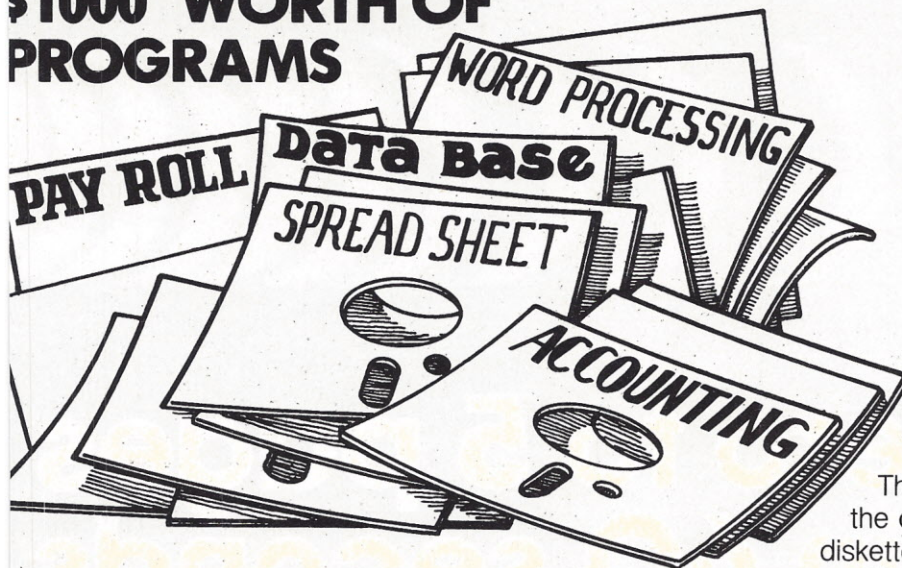


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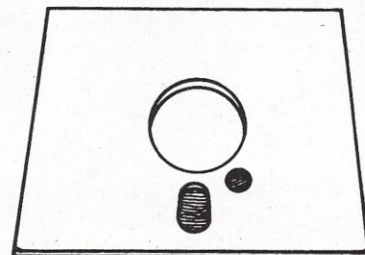
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CIRCLE 44

OUTLOOK

participate in decisions on whether to purchase hardware and software for their schools. The computers they use most frequently are Apple, Radio Shack, Commodore, Atari and Texas Instruments equipment, in that order. Apple, Radio Shack and Commodore account for 87 percent of the total.

At present, computers are used most frequently for drill and practice, enrichment, games, computer literacy and programming. Some teachers expressed the view, however, that they hope to use computers increasingly to teach problem-solving and decision-making. A computer, they felt, should not just do the same job that a book or worksheet will do for less money; it should be used in ways that capitalize on its unique capabilities in instructional areas.

HIGH-SPEED DATA LINK NO BOON FOR PERSONAL-COMPUTER USERS—YET

A new high-speed data link that will bypass existing telephone lines in completing digital transmissions is

expected to greatly improve computer to computer communications, and make it much more economical to transfer large amounts of data. For at least the early going, though, the personal computer will remain on the sidelines of this technology.

The new network, which was approved by the Federal Communications Commission in July, will operate over microwave or satellite bandwidths. Instead of relaying data over long-distance telephone wires—a slow process because phone wires were designed for voice communications, which are relatively slow themselves—the network will transmit information directly over the airwaves. Some major communications firms, such as MCI Communications, ISA Communications Services and Tymnet Inc., have already been authorized to develop the service.

Large corporations with massive amounts of data to ship will be early users of the data-link, but officials involved say that for the system to generate a profit over the long term, it will have to reach a wider customer base.

“Ultimately, the marketplace for all data communica-



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tions breakthroughs, including this one, is the home computer or small business computer user," says Gary Tobin, a spokesman for MCI in Washington, D.C. "In 12 to 18 months, this network will be available for mainframe computers and mostly large corporations. Some time after that, although I'm not able to predict when, it will be able to be accessed by personal computer users."

The high-speed network is considered a major innovation in data communications because, essentially, it avoids the information bottlenecks that, according to Tobin, many high-speed computer users have had to suffer through when transmitting data over phone lines. "The local phone companies," Tobin says, "are not capable of, or interested in, providing the high speeds that a user needs to send a great amount of computer data quickly. Local phone companies are in the business of voice transmissions."

The data link, as planned, will transfer information at speeds of over a million baud, far more rapidly than any data communications hardware can output currently.

Most personal computer modems, which connect to local telephone lines for data transmission, operate at 300 baud, with 1200 baud modems now just reaching the marketplace.

Although there is a great variance between the current needs of personal-computer owners and the high speeds of the new service, officials involved feel that, as with any innovative technology, the personal computer marketplace will grow to fit its new possibilities.

"As the sophistication of the home computer user grows," Tobin says, "he will need a system like ours to meet his needs."

One application where personal computer-users could turn to high speed, high-volume data transmission is in the sending of high-resolution pictures over long distances. The type of rapid and massive data movement that is involved in graphics transmission could not be accomplished using present phone lines without consuming large amounts of time, which many could find objectionable.



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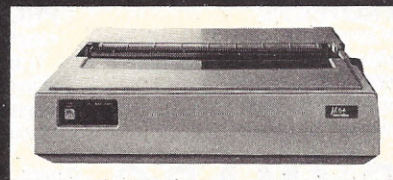
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ANSWERS

(continued from page 17)

pensive interface/converter for your Selectric or the newer electronic IBM typewriter. Salesmen for the other makes claim the IBMs aren't as up-to-date, have more moving parts, make more noise, and use a less versatile ball-style printhead instead of a daisywheel. But if you already have them in the office, a \$500 Mediamix computer converter might be the way to go. And you may like the service you get. Be sure to give the noise factor of each machine you're considering a real test, by the way. Buying printers can resemble buying shoes. What's tolerable in the store may become progressively less so in time.

The other makes are not perfect, either. For instance, Olivetti suffers

from a reputation for intensive service needs—the price perhaps for offering more bells and whistles than the others. However, we have one in our western field office that's been reliable through a pretty solid duty cycle. And its service contract is only \$150 a year.

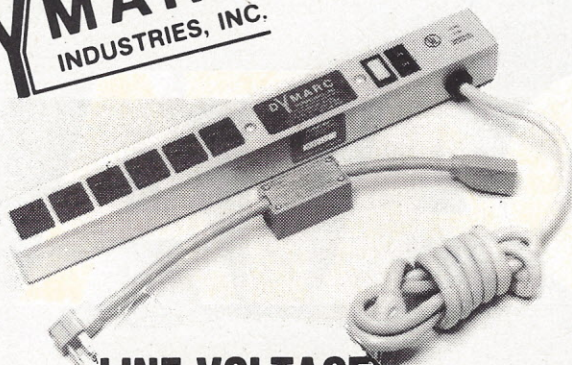
Appropriate Olivetti, Triumph-Adler and Olympia models list for about \$1400 complete with computer interface and connector cables. You might check, though, on the cost of print wheels, ribbon cartridges, correction tape and service contracts. You might lose the advantage of one machine's lower purchase price ribbon-by-ribbon, so to speak.

Your computer needs the appropriate port or you have to get a control-

ler card for another \$100 or so. If you also have a dot-matrix printer, you have to decide whether to have separate cables and use duplicate disks of your different printer-using programs, configured for one printer or the other—or you can get a hardware switch (which could prove rather expensive). This could be especially advisable if you use an uncopyable word-processing program—though even with one of these you could configure the manufacturer-provided backup disk for the letter-quality printer, assuming that's the one you'd use less.

Normally, paper feed isn't much of a problem with moderate duty cycle letter-quality printing. With a heavy duty cycle you start looking at multi-

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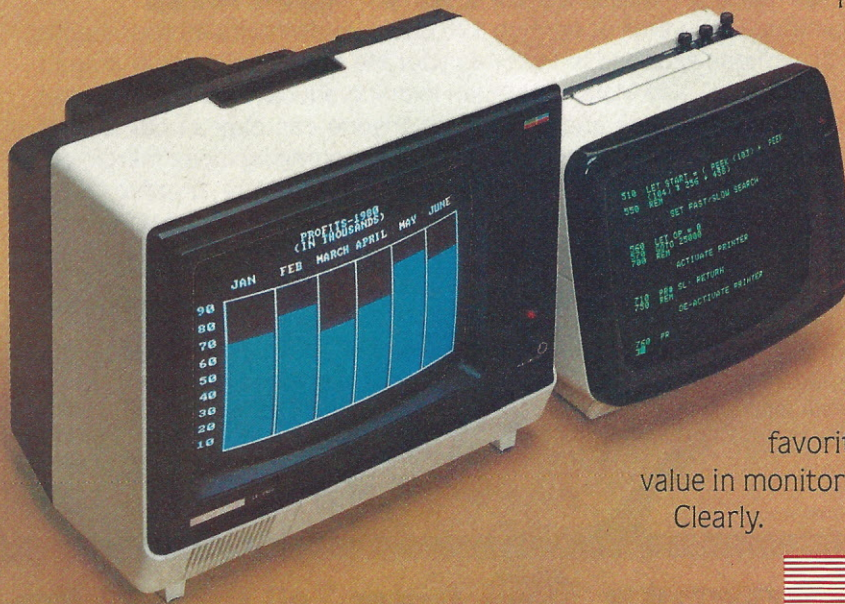
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ANSWERS

ple sheet feeders, which cost more than the typewriters we're discussing here, or tractor feed, which uses cog-wheels to pull the paper through via two vertical rows of holes on each side of the paper. After printing, the strips containing the holes are torn off along perforations. Tractor feed is needed most for printing forms, where exact placement of the print is crucial. But that's also most likely to be done on your dot-matrix printer. And your high-class business letters won't look too toney with the border left by the perforations.


High-quality bond paper is now available with such fine perforations they're almost unnoticeable. But loading a roll of tractor-feed paper goes against the spirit of having the

typewriter/printer available for those small jobs. And if you have letter-head stationery on your tractor feed in fanfold paper, what do you do with letters that run onto two pages? Moderate needs are best suited by the versatility of simple friction feed on the typewriter, and tractor feed on the dot matrix.

You may ask if you could use such a machine for your computer input, as well as printing output. That is possible—for about \$500 more. But you will have to get used to a keyboard that has computer-specific controls (escape, control, cursor control) in funny places—and some controls you're used to may be missing altogether. You might want to have that facility available for remote data

entry into your computer. But it would be hard to enter data when you couldn't see it on a screen in front of you. And for that \$500 you could buy a computer keyboard of good quality.

In some areas at least it's possible to rent an electronic typewriter complete with computer interface and cable, with the first month's rent applicable to purchase. One store we checked offered an Olympia 100 for \$100 a month plus a \$46 installation fee—both refundable on purchase.

You might wind up doing some fiddling getting the configuration of your computing system matched up to the typewriter. If you abhor tinkering, you should consider letting your computer dealer do it. 

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SAVVY

MARKETING INTERNATIONAL

Two New Portable Computers Unveiled

DESIGNED WITH THE BUSY EXECUTIVE IN MIND

Dynalogic Info-Tech Corp., a nine-year-old high-technology company based in Ottawa, has unveiled its new portable personal computer. Known as the Hyperion, the new computer was developed especially for the business executive and professional manager. It is priced in the \$4500 range.

"The Hyperion was designed so that first-time computer users would find it easy to operate," says Dynalogic president Murray Bell, "and to be a practical decision support tool as well."

While the Hyperion is a compact computer, it is compatible with the IBM Personal Computer. It weighs 20 pounds, is small enough to fit under an airline seat, and comes with a specially designed soft carrying case.

The small size is due, in part, to the use of large-scale integration. Functions like CRT control, which used to

from the main unit, and a 7-inch non-glare CRT with amber phosphor for viewing comfort.

The display system of the new computer has an alphanumeric screen format of 25 lines of 80 characters; a character set of 256 different characters, including Greek alphabet, special foreign-language characters, and special mathematical and line-drawing symbols. Character attributes include underline, blink, intensify, reverse video, double size, subscript and superscript.

The system also includes a built-in 300-baud modem with auto-answer capability, auto-dial using either touch tone or dial pulse, direct connect to modular telephone jack, and optional acoustic cups for use when a modular telephone jack is not available.

Other features include a time and date clock with a battery back-up, keeping time even when AC power is removed, a programmable sound system, a composite video output jack for connecting an external video monitor, and an optional expansion chassis with a 10Mb Winchester cartridge drive and four IBM-compatible I/O slots.

Portability and price are two key selling points, according to Dynalogic. Smaller than the IBM Personal Computer, the Hyperion can travel with the professional manager and is also priced approximately \$2000 less than an IBM with the same capacity.

Dynalogic's portable computer also offers a built-in suite of software designed to serve as a "decision-support system" for the professional manager and executive. "That decision support system software," according to Rick Crutchlow, vice president of marketing, "includes Multiplan, a sophisticated electronic spread sheet; an executive text processor; an electronic-mail communications system; and Microsoft BASIC."

Dynalogic's system is directly aimed at professional and managerial employees. "It will enable executives to have instantaneous access to facts and figures," says Crutchlow. "Its electronic-mail capability will also enable them to keep abreast of business developments, whether they are in a hotel halfway around the world or just home for supper, by direct access through local telephone lines to other computers."

To compete in the world marketplace, Dynalogic will sell the Hyperion through the traditional retail markets, such as your local computer store, but it will also market the Hyperion by means of a world-wide direct-sales force calling on the world's largest corporations. "Those corporations which have not yet become involved with the new technologies need assistance and education about the



The Hyperion computer from Dynalogic is compatible with the IBM personal computer and weighs 20 pounds.

take more space, and data separation, used for floppy-disk access, have been integrated in order to greatly condense the Hyperion's circuitry.

"In one 8-pin package, the data-separator chip does the work previously done by five chips," explains Bell. "By using these new chips, we were able to condense the equivalent of four circuit boards into two multilayer boards."

The Hyperion also features an Intel 8088 16-bit processor, an optional 8087 floating-point processor, 256k user RAM, 20k display RAM, a 5 1/4-inch dual-sided disk drive with 327,680 bytes of storage capacity, a detachable keyboard which can be used up to four feet away

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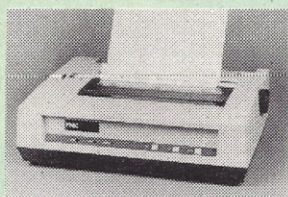
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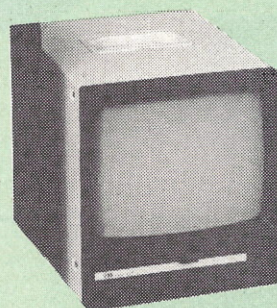
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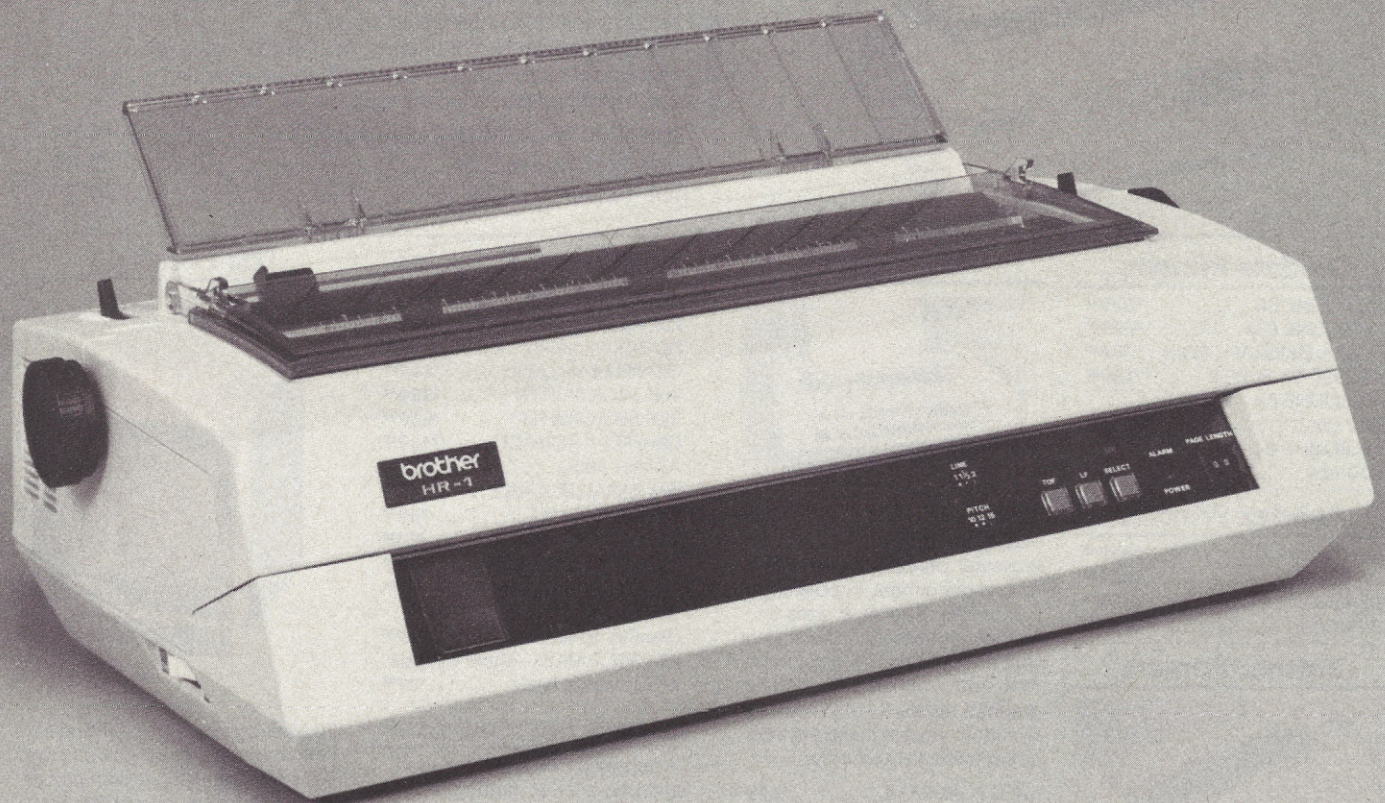
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CIRCLE 111

HARDWARE OF THE MONTH

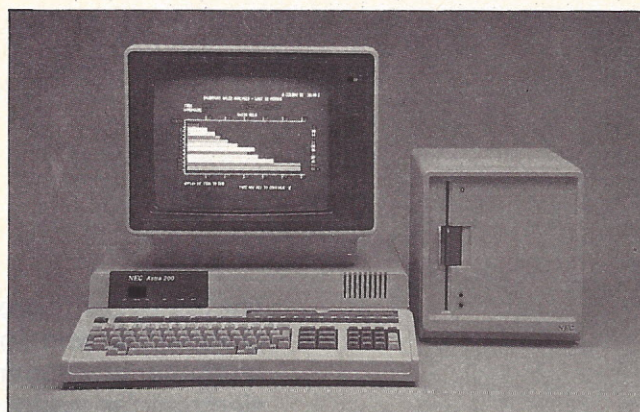
benefits that can be derived from giving their professional managers access to the capabilities of the Hyperion," says Crutchlow.

FOR MORE INFORMATION: DYNALOGIC INFO-TECH CORP., 141 Bentley Ave., Ottawa, Canada K2E 6T7; (613) 226-1383.

NEW SYSTEM LAUNCHED BY NEC INFORMATION SYSTEM

The computer arena is truly getting crowded as more systems vie for the customer's attention. The latest is the Model 200, a low-end addition to the Astra series, from NEC Information Systems.

The 200 sports a 16-bit microprocessor, and the standard memory size is 256k bytes. In its initial config-



The NEC Model 200, the entry-level computer in the Astra series, has a standard memory of 256k bytes.

uration, the 200 is available with four different combinations of monitors and storage systems, including:

- Monochrome display with dual floppy disks.
- Monochrome display with fixed disk (4 Mbytes or 9.25 Mbytes).
- Color display and dual floppy disks.
- Color display and fixed disk.

The Model 200 also has a single communications port and supports communications with bisynch protocols (an IBM-defined protocol) and 3780/3740 emulators (specific terminal-emulating software). In addition, the processor can support a special batch-file transfer protocol called Astra-Link. Data are transmitted at up to 4800 bits per second.

In addition to the standard QWERTY pad (named after the leftmost keys on the top of a standard typewriter keyboard), the keyboard has 17 special function keys and a ten-key numeric pad.

The Astra series, of which the 200 is now the entry-level unit, is a complete system developed by NEC for use in business applications by non-technical personnel. It,

(continued on page 208)

Explore the excellence of your ZX81 with a

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MEMOPAK 64k memory extension for \$179.95

Give your diminishing memory more byte.

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You can use our MEMOPAK in your home without obligation. After 10 days if you are not completely satisfied, simply return it for a full refund.

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Further information forthcoming.

Memotech Corp. 7550 W. Yale Ave. Suite 220 Denver, Colo. 80227

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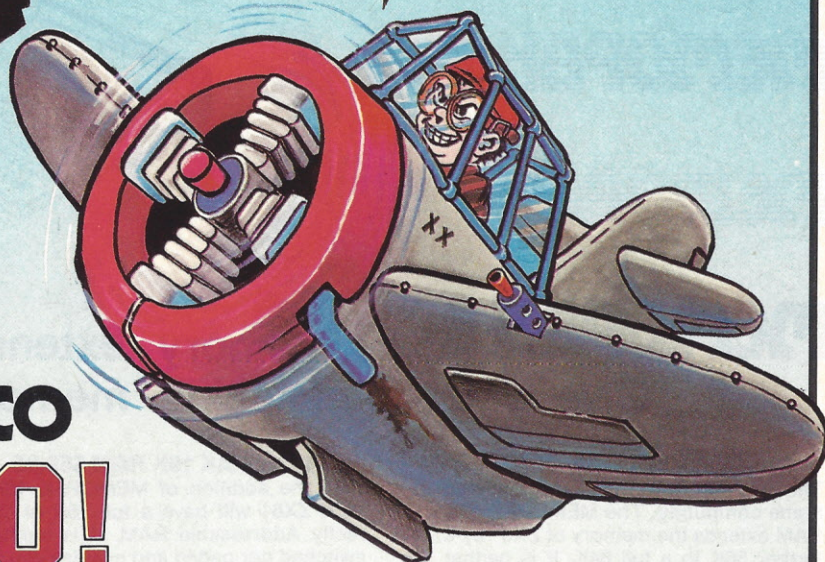
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HARDWARE OF THE MONTH

(continued from page 204)

like most computer systems, has three main components—the operating-system software, the applications software, and the hardware. The Model 200, specifically, comes with its operating system software (the software that provides the basic link between the user and the hardware) included in the price, or bundled. The applications software is extra, however. This applications software includes business-applications programs (sales-order processing, accounts receivable, accounts payable, inventory control, sales analysis, payroll, general ledger and purchase-order processing); Word Processing; Financial Modeling; COBOL, FORTRAN and BASIC programming languages; a data-management utility, and other specialized utilities.

Other items available, but at extra cost, include memory expansions in 128 kbyte increments to a total of 512 kbytes, a printer (either dot-matrix or Spinwriter fully-formed character printer) and storage-expansion units, which provide additional storage for Model 200s that have floppy-disk storage in their initial configurations.

The Model 200 sells for \$4500.

FOR MORE INFORMATION: NEC INFORMATION SYSTEMS
5 Militia Drive, Lexington, MA 02173. (617) 682-3120

EPSON JOINS PORTABLE-COMPUTER FRAY

The move to small, portable computers is on, and Epson figures to be in on the action. Its new HX-20 computer is so small that it can fit into a briefcase, so power-saving that it can run for 50 hours on its internal power supply, so versatile that it interfaces with a variety of peripherals and so helpful that you can shut the whole thing down and not lose the data in RAM.

And for all that, it costs less than \$800.

One of the problems that portable-computer manufacturers face is the small screen. If the computer is really to fit into a briefcase, the screen has to be tiny—or else some other steps have to be taken. Grid, for example, folds its flat-panel display down onto the top of the computer box when the machine is to be transported from place to place. Epson has another solution, called a virtual screen.

The virtual screen works this way. The computer thinks it has a full screen, at least as far as the user is concerned. There is only a small portion of the screen visible to the user at any one time—four lines, 20 columns. The user can jump from one portion to the other as if he were turning pages in a book.

The computer can give a printout, too, with its built-in 24-column dot-matrix printer. This one is good for program listings, data listings and the like. If correspondence printing is required, the computer interfaces with Epson's MX printers which deliver 80- or 120-column printing.

A "BASIC" Reading List

Comprehensive Guides to
Programming from Hayden Book Co.

Basic Computer Programs for Home,
\$10.95

Basic Computer Programs for
Business, Vol. 1, \$10.95

Basic Computer Programs for
Business, Vol. 2, \$13.95

Basic Basic, 2nd Edition, \$11.50

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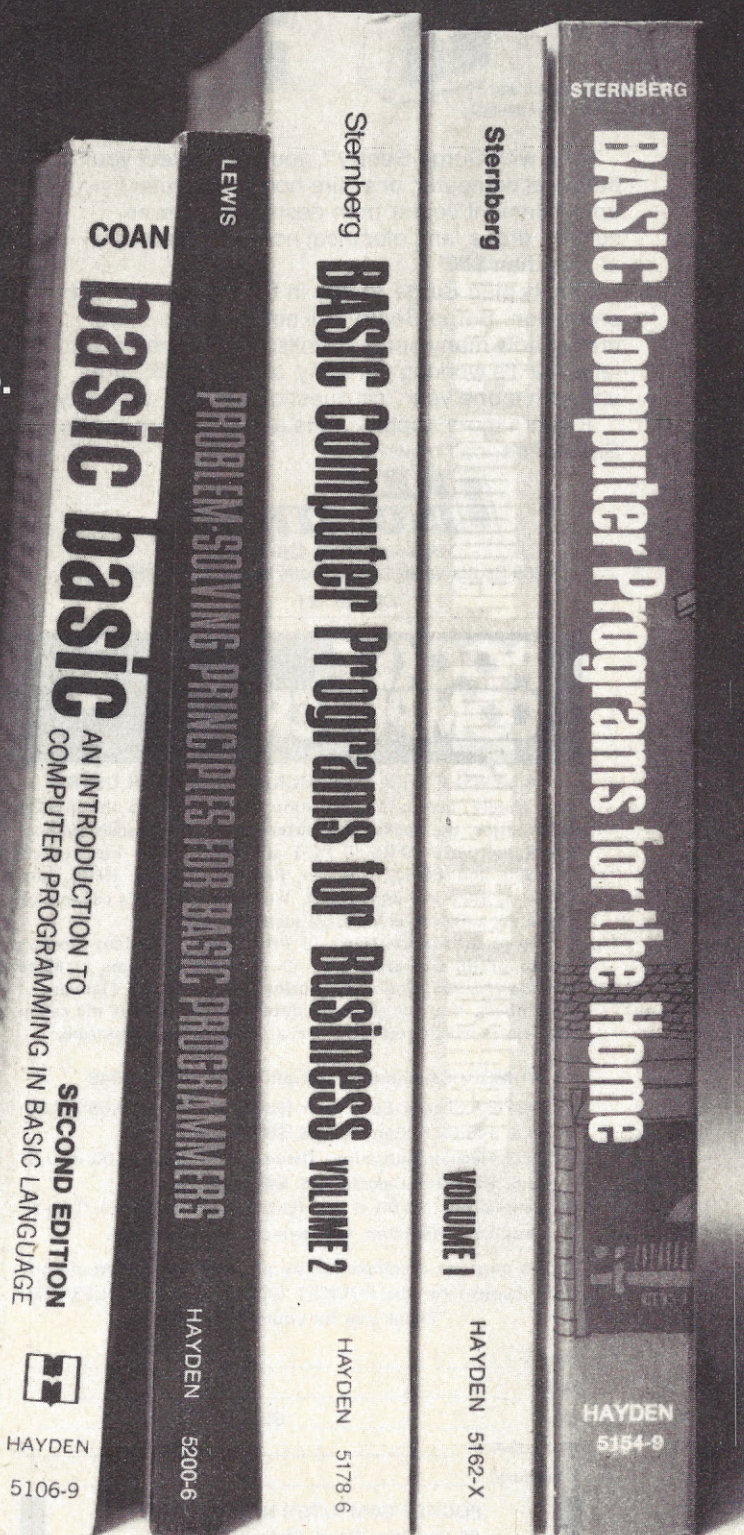
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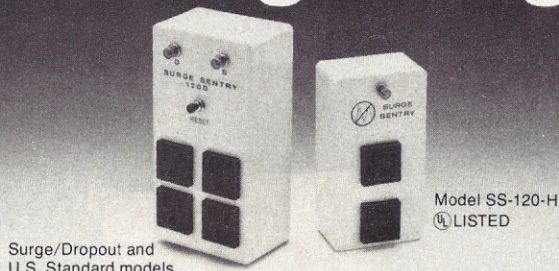
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CIRCLE 121

POCKET COMPUTER NEWSLETTER



A NEWSLETTER FOR POCKET COMPUTER USERS

This timely, compact publication provides up to the minute information on pocket computers, including models such as the Radio Shack TRS-80 PC-1 and PC-2, Sharp Electronic's PC-1500 and PC-1211, Casio, Panasonic/Quasar HHCs, and others as they are announced. We only cover PCs capable of executing a high level language such as BASIC.

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- ☐ Sample issue. \$3.00 in U.S. (U.S. \$4.00 elsewhere.) *Due to credit card minimum, this item cannot be charged.

Orders must be accompanied by payment in full. We do not issue invoices for the POCKET COMPUTER NEWSLETTER.

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POCKET COMPUTER NEWSLETTER
35 Old State Road, Oxford, CT 06483

CIRCLE 173

HARDWARE OF THE MONTH

Other standard features include 16k of RAM and 32k of ROM (expandable to 32k and 64k respectively), an RS-232-C interface, a full-size keyboard and an extended version of Microsoft BASIC.

FOR MORE INFORMATION: EPSON AMERICA, 3415 Kasiwa St., Torrance, CA 90505; (213) 539-9140.

IMITATES DAISYWHEEL

The new Microprism dot-matrix printer from Integral Data Systems Inc. offers print quality approaching that of a daisy-wheel printer at a lower price than has



Microprism printer is the first dot-matrix in its price range to provide single-pass capability, a feature usually found only in daisy-wheel printers.

previously been available. It is positioned to fill the need for high quality output without costly extra printer features.

"At \$799, it's the only printer on the market today that will do so much for so little," claims Integral's vice president of marketing Peter R. Eisenhower.

"The market has been dominated by printers which have offered improved quality output only in a slower, multi-pass mode. This printer is an inexpensive high-quality dot-matrix with single-pass capability."

FOR MORE INFORMATION: INTEGRAL DATA SYSTEMS INC., Milford, NH 03055.

PORTABLE TERMINAL PRICED BELOW \$1000

Radio Shack has introduced an under-\$1000 portable printing data terminal. The TRS-80 PT-210 Portable Data Terminal is available for \$995.00 at Radio Shack Computer Centers or the expanded computer departments of selected Radio Shack stores and dealers.

(continued on page 214)

microplanTM

the electronic worksheet for CP/M[®] users.

AUTOMATIC
WHAT-IF

MODE=NORMAL ORDER=R/O ROW=1-50

ROW 1 (Net Sales) <--
ENTER COMMAND:

ROW	First Quarter	Second Quarter	Third Quarter	Fourth Quarter		
1 Net Sales	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	44
2 Cost of Good	450.0	489.5	532.4	579.0	2,050.9	45
3 Gen & Admin	200.0	220.0	242.0	266.2	928.2	46
4 Res & Develo	300.0	350.0	400.0	450.0	1,500.0	47
5 Total Costs	950.0	1,059.5	1,174.4	1,295.2	4,479.1	48
6 Gross Profit	50.0	40.5	35.6	35.8	161.9	49
7 % Profit	5.0	3.7	2.9	2.7	3.5	50
8	0.0	0.0	0.0	0.0	0.0	51
9	0.0	0.0	0.0	0.0	0.0	52
10 % C.O.G.S.	45.0	44.5	44.0	43.5	0.0	53
11	0.0	0.0	0.0	0.0	0.0	54
12	0.0	0.0	0.0	0.0	0.0	55
13	0.0	0.0	0.0	0.0	0.0	56
14	0.0	0.0	0.0	0.0	0.0	57
15	0.0	0.0	0.0	0.0	0.0	58
16	0.0	0.0	0.0	0.0	0.0	59
17	0.0	0.0	0.0	0.0	0.0	

Available
for CP/M 86

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MICROPLAN SOLVES PROBLEMS. MicroPlan lets

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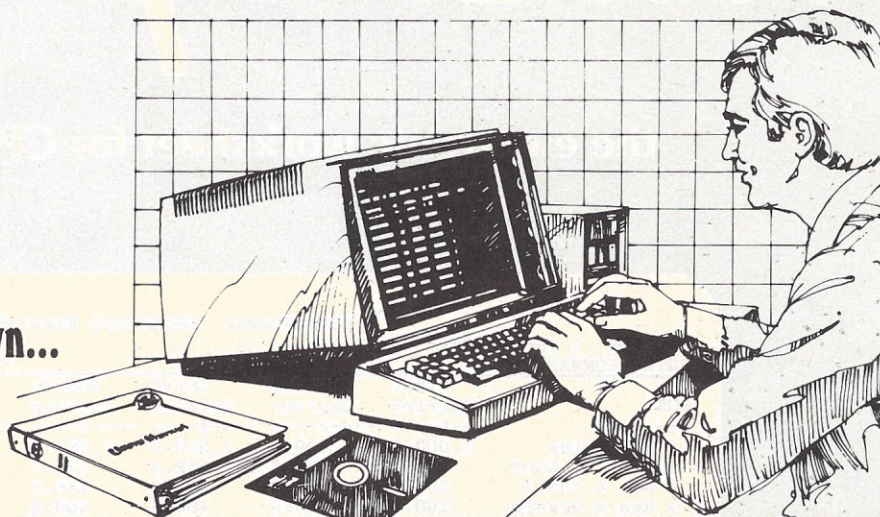
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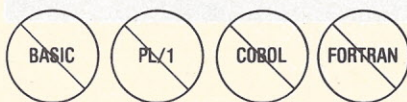
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Save 90%. Because no complex programming is needed, Condor saves *up to 90%* of the cost of program writing and testing! You also eliminate costly and time-consuming programmer "talent searches."

State-of-the-art relational format.

Condor makes traditional programming approaches using compilers *obsolete*. Features such as SORT, DEFINE, ENTER, POST AND REORG permit rapid database creation, access, control, monitoring and manipulation. For instance (by using the JOIN command), you can combine the information contained in two large file cabinets—such as "Purchases" and "Labor Cost"—

into a single file—in one operation. To do the same task, ordinary software usually requires substantial reprogramming.

Easiest to learn and use.

Independent evaluators rate Condor more "user-friendly" than any other personal/business computer database system. After a brief study of the manual, you start building a database *within 15 or 20 minutes*.

In fact, *Condor has allowed many hundreds of first-time users to produce and process their own management reports.*



Only \$295 for entry level.

Condor's multi-level modular design provides *full upward compatibility*, up to the most powerful software of its kind in the industry. The entry level Condor I features database file development and management; entry, update,

and posting; inquiry and report writing capabilities; and complete operations aids. And as information needs grow, you can easily upgrade to Condor III for writing highly complex reports and fast-query indexing.



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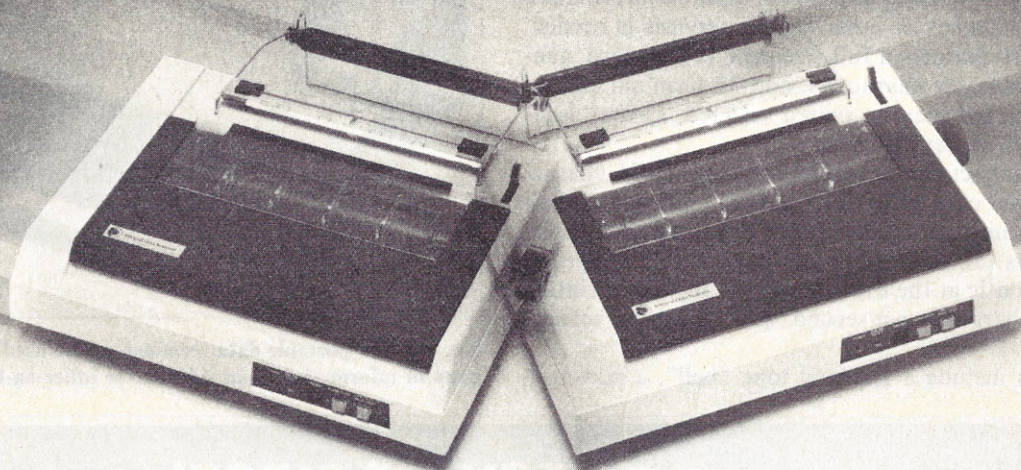
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Integral Data Systems introduces the only low-cost dot matrix printer on the market that features Maisey™ printing. Maisey printing is a technique that allows you to produce correspondence-quality text approaching that of more expensive daisy-wheel printers, but at much faster speeds.

How fast? With Microprism Printer's™ dual speed capability, you can output at 75cps in correspondence-quality and 110cps in high-speed data mode. And it also features sharp, high-density graphics in an 84 x 84 dpi format.

You'll get cleaner, crisper output than you ever thought possible in a single pass.

Other standard features of the Microprism include proportional

spacing, text justification and, of course, software compatibility with our more expensive Prism Printer™ line.

The Microprism Printer is the perfect system mate that can handle all of your printing requirements . . . it's the best of both worlds. So if you've been waiting for the price of daisy-wheel printers to come down, or the quality of dot matrix to go up, now is the time to check out the exciting new Microprism Printer from Integral Data Systems.

Stop in at your local dealer today and ask for a demonstration. If you need the name of the dealer nearest you, call us toll-free at (800)258-1386.

Or write Integral Data Systems, Milford, NH 03055.



Integral Data Systems, Inc.

Microprism Printer, Prism Printer and Maisey are registered trademarks of Integral Data Systems, Milford, NH.

HARDWARE OF THE MONTH

(continued from page 210)

This new offering—Radio Shack's first venture into the highly-active portable printing terminal market place—includes a full "typewriter" keyboard, a quiet thermal printer and a 110/300 baud acoustic telephone coupler in a compact, portable package. It is useful for applications where hard copy of computer information or information provided by videotex or other on-line services is needed.

The PT-210 features a full-size ASCII keyboard, generating 67 printable characters, and 32 terminal control characters. Speed may be switch selected, as may half-duplex or full-duplex operation.

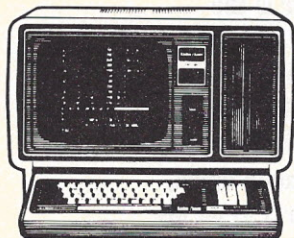
The non-impact thermal printer can print 71 characters, with lower case letters automatically printed as their upper case equivalents. Each 8-inch line can include up to 80 characters (10 characters per inch), and carriage return is automatic at the 81st column on any line. Printing speed is 50 characters per second, with 6 lines per vertical inch.

Indicators include a $\frac{1}{4}$ -second tone "bell", a power-on



The PT-210 portable data terminal can be used to provide hard copy of information from videotex or other on-line services.

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TRS-80 is a registered Trademark of Tandy Corp.

lamp, a carrier detect lamp and a character error detect lamp.

FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102.

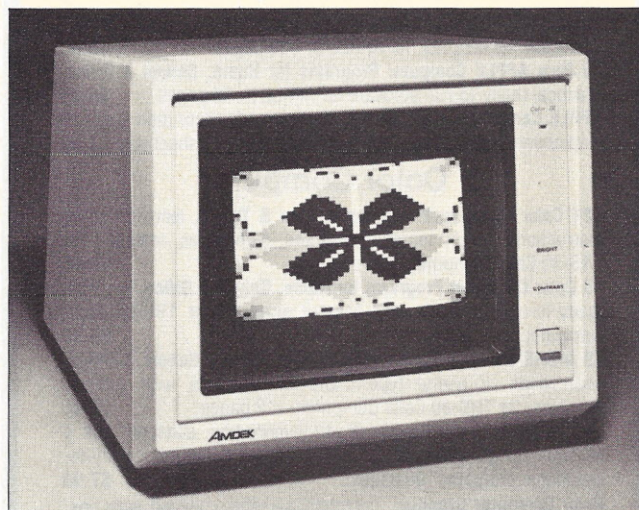
HIGH RESOLUTION 13" MONITORS

Two new 13" Color monitors from Amdek Corp. are slated for the high-end, quality-conscious business computer user.

The Color IV, has 720 (H) by 420 (V) line resolution, with an 80 × 24 character display and capability for 4096 computer-controlled color variations. It is compatible with the Apple III, and the new DEC VT-125 terminal.

The Color IV video monitor weights 25.3 pounds and offers industrial-environment cabinetry. Suggested retail price is \$1,299.

FOR MORE INFORMATION: AMDEK CORP., Marketing Dept., 2420 Oakton St., Suite "E", Arlington Heights, IL 60005.



The Amdek Color II-A and Color IV 13-inch video monitors provide up to 4096 color variations.

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CIRCLE 126

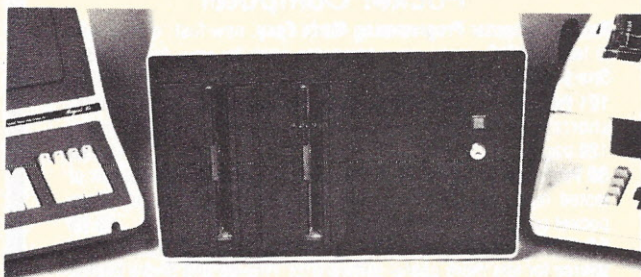
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CIRCLE 125

Computer Program Books for Beginners

Everything you need to know to get started programming your own computer. These handy books of programs, each jam-packed with easy-to-understand info for beginners, are crammed with hundreds of tips, tricks, secrets, hints, shortcuts, techniques, plus hundreds of ready-to-run programs.

APPLE Computer

- 101 APPLE Computer Programming Tips & Tricks**, secrets, hints, shortcuts, techniques, for APPLE II, 128 pages. **\$8.95**
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Color Computer

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Color Computer Coding Form, handy preprinted programming worksheets make writing software easy, fun, 40-sheet pad. **\$2.95**

Pocket Computer

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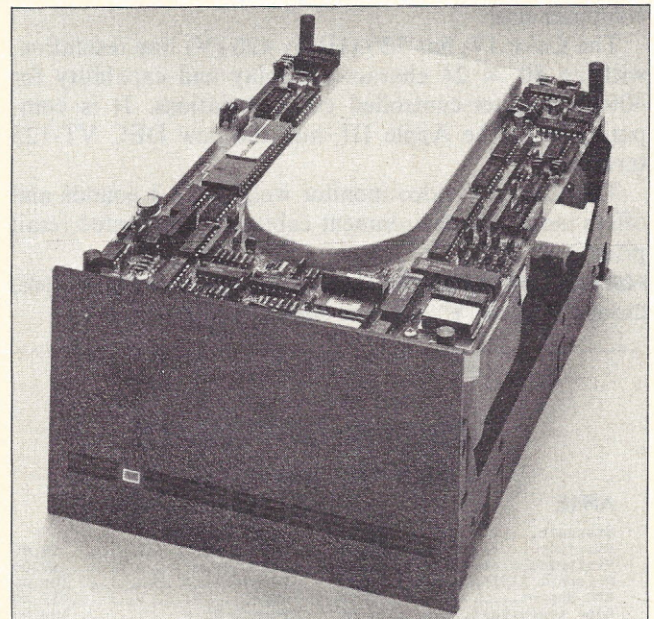
Customers outside North America wanting airmail send \$4 postage per book. U.S. dollars.

HARDWARE OF THE MONTH

SPEED IS KEY TO ATASI DRIVES

Atasi Corp. has unveiled the first products of a family of high-performance 5 1/4-inch Winchester disk drives, all with a data access time of 30 milliseconds.

Part of the Series 3000, these fixed rigid disk drives have memory capacity superior to most 5 1/4-inch products, and access time normally found only in 8-inch and 14-inch products, according to Frank C. Gibeau, presi-



The Atasi Winchester drive has a high-speed data access time of 30 milliseconds.

dent. The models, the 3046, 3033 and 3020, have 46.3, 33.7 and 19.8 Mbytes of unformatted storage.

"In the push for high capacity 5 1/4-inch disk drives, manufacturers often overlook the requirement for low access time," said Gibeau. "The combination of high capacity and fast access, achieved in the Atasi products, is vital to the new generation of multi-user, multi-tasking computer systems. It brings such applications as local area networking and computer graphics more within reach of small-business computer and office-automation equipment users."

Final production of the drives will begin in early 1983 with prices starting at close to \$2000.

FOR MORE INFORMATION: ATASI CORP., 235 Charcot Ave., San Jose, CA 95131.

THE SOFTWARE DIFFERENCE

Burroughs Corp.'s new B20 small business computer system is aimed at businesses with gross revenue

(continued on page 220)

Which would you rather speak?

```
A>PIP A:=B:ACCNT1.DAT[V]
```

Your computer's language.

CP PLUS DISK FILE COPY

This facility allows copying of files
from one disk to another.

```
YOUR CURRENT DISK IS DRIVE A. DRIVE TO COPY TO? B  
FILENAME OF FILE TO BE COPIED? ACCNT1.DAT
```

Or your own.

Hello CP+. Goodbye CP/M® techno-jargon.

It's time you had a talk with your computer—in English. With CP+ add-on software, you can.

CP+ eliminates complicated CP/M® commands, and replaces them with simple English messages, "menus" and directions. It takes the frustration out of CP/M® computing. So even non-technical users are guided through all their computer functions, including "housekeeping" tasks (such as COPY, ERASE, PRINT).

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NAME and MODEL OF COMPUTER _____

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September 1982 PERSONAL COMPUTING 219

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HARDWARE OF THE MONTH

(continued from page 216)

of under \$25 million, although it can be used for stand-alone applications and as part of distributed processing networks.

In the eight countries where the B20 is being released initially, system instructions will be available in the local language. Burroughs estimates that a computer novice thus can install and begin running an entire accounting module in two days.

"The B20 can deal with the full scope of the needs of small businesses as well as the network needs of big businesses," says Ben L. Rouse, the Burroughs vice president who headed the B20 project. Michael Blumenthal, chairman and chief executive officer, adds: "We are offering a product designed for the information requirements of the 1980s."

The B20 features a 16-bit processor; RAM memory expandable from 128k to 640k; disk storage ranging from low-cost mini disks to high-performance Winchester disk drives, and a choice of application specific printers. In

designing the system, the company incorporated the latest in ergonomic features, including a movable keyboard and a 15-inch, high-resolution display with full tilt and swivel capabilities.

Introduced along with the B20 is a broad selection of business-oriented software, including a general business system (order entry, billing, accounts receivable, inventory, accounts payable, general ledger and payroll), Multiplan, a financial worksheet program, a forms editor, word processing and several industry specific products.

Specific applications software includes packages for wholesale distributors, manufacturers, contractors, pharmacists, small utilities, retailers, accounting firms, farmers, fuel oil dealers, insurance agencies, food brokers, nursing homes and savings and loan associations.

The new BTOS B20 operating system will support four industry-standard programming languages (BASIC, COBOL, Pascal and FORTRAN), as well as new data management facilities. It will also provide full integration between word and data processing and offer a wide vari-

APPLE SPEAKS INTELLIGENTLY!

The people who dared to teach Atari to talk are again challenging the microcomputer establishment with the VOICEBOX Speech Synthesizer for Apple. This low cost intelligent peripheral can speak thousands of words unassisted, generated directly from its firmware ROM dictionary located on its plug-in card. This means that speech, with variable intonation and speed, can be used in any of your apple programs without ever having to bother loading a disk. And, in case you want to expand your dictionary to include unusual words or words in foreign languages, you can easily define them with our 64 phonemes and store them by the thousands on one of the six special dictionaries provided for on our disk.

In addition your VOICEBOX for Apple can be easily coded to sing on key with uniform barlengths and you can store (record) your songs on disk, retrieving and modifying sections whenever you want. With the disk system, you'll also enjoy an educational random sentence generator and graphic speech animation! The VOICEBOX for Apple will run on 32K Apple II with Applesoft or Apple II Plus systems equipped with sixteen-sector disk drives. VOICEBOX for Apple comes with loudspeaker and disk. The Alien Group also makes a less expensive VOICEBOX for Apple with all features (including expandable disk dictionary), but excluding firmware ROM and singing capability. Speaker is optional on this unit.



For Atari users, the VOICEBOX for 16K and up Atari plugs directly into the serial port. No extra cables are needed and no speaker is needed since the speech comes directly over your TV monitor. This unit has all speech synthesis features except singing and firmware ROM.

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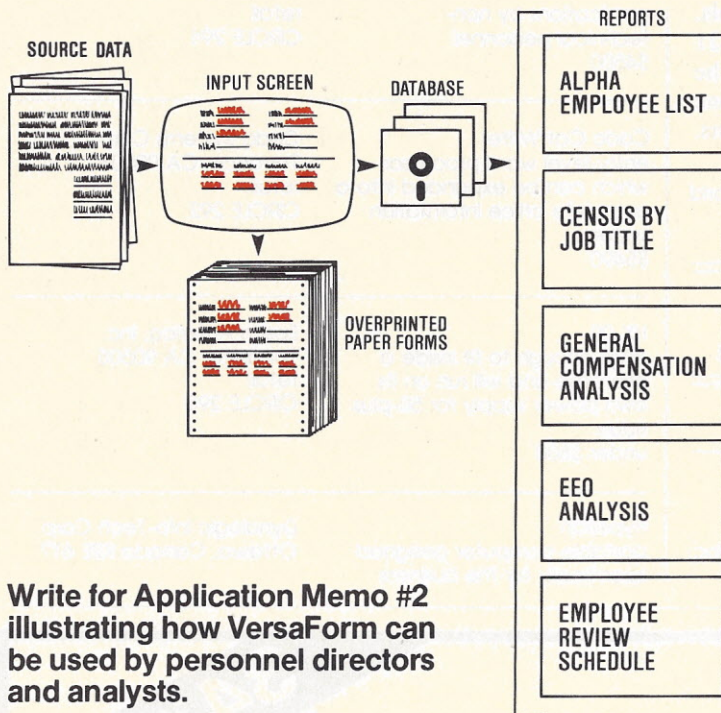
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HARDWARE OF THE MONTH

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There are two major series in the B20 family, the B21 and B22. There are four models in the B21 series: the B21-1, B21-3, B21-4 and B21-5. The B22 consists of one model that can be configured with a series of options. Workstation prices start at under \$5000.

FOR MORE INFORMATION: BURROUGHS CORPORATION, World Headquarters, Detroit, MI 48232.

HARDWARE INDEX

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hours
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Stat Pak \$ 80

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*Visifile 2 \$ 185

*Visitrend/Plot 3 \$ 215

*Visipack 1, 2, & 3 \$ 550

Visischedule \$ 235

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(CP/M*/Apple*)

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Write-On \$ 99

II, III, IBM PC \$ 99

Micropro*

*Wordstar \$ 259/198

*Mailmerge \$ 79/69

*Both \$ 336/265

Datastar \$ 195/168

Spellstar \$ 129/118

Calcstar \$ 159/118

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Supersort II \$ 140/

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(cassette/disk)

Datamost*

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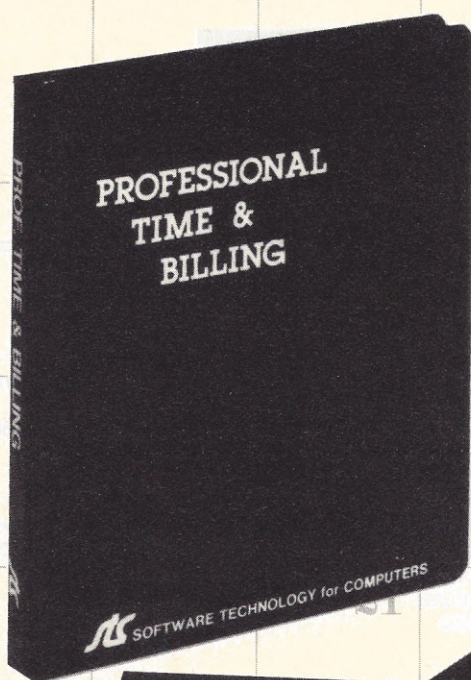
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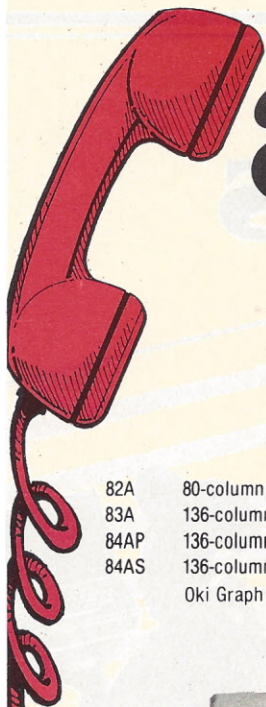
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(continued on page 228)



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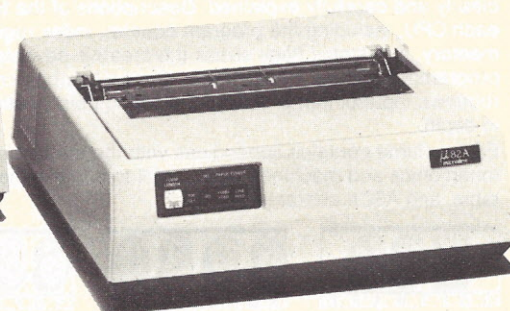
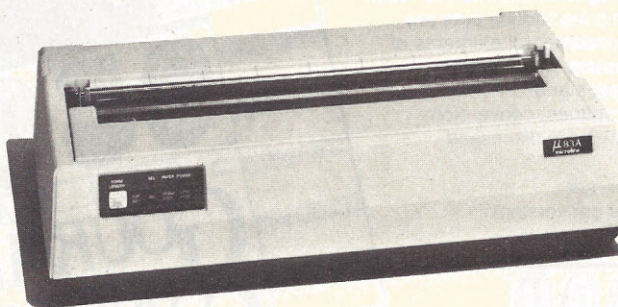
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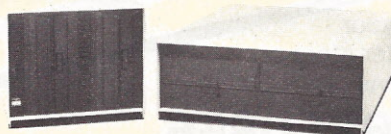
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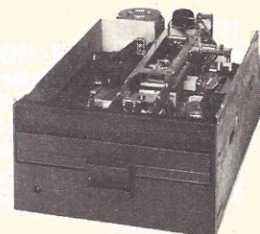
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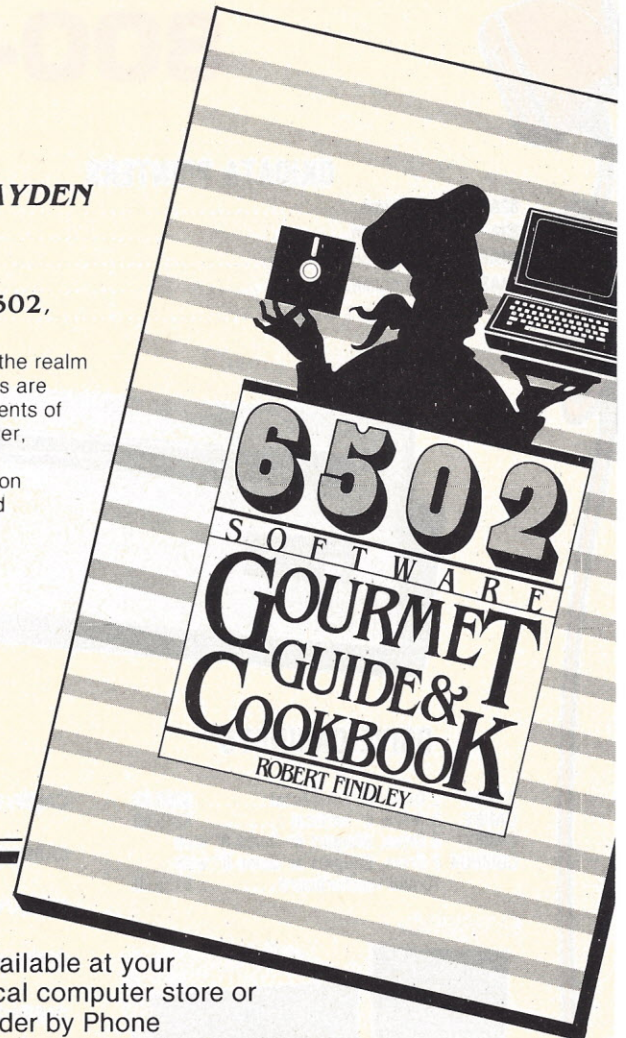
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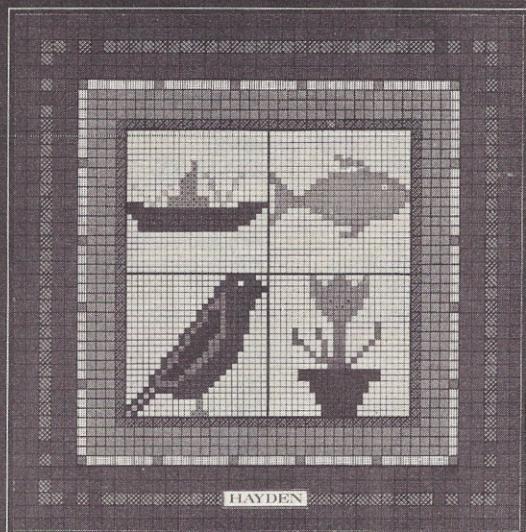
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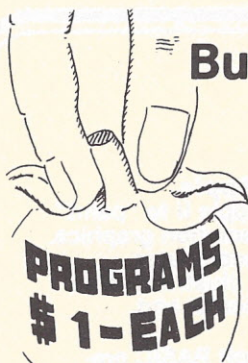
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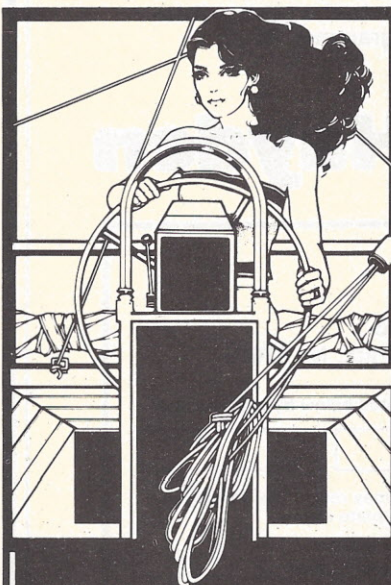
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(continued from page 224)

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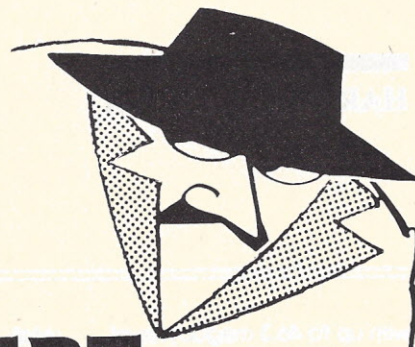
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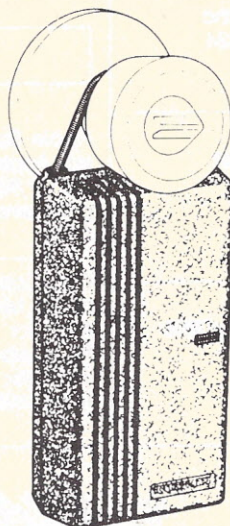
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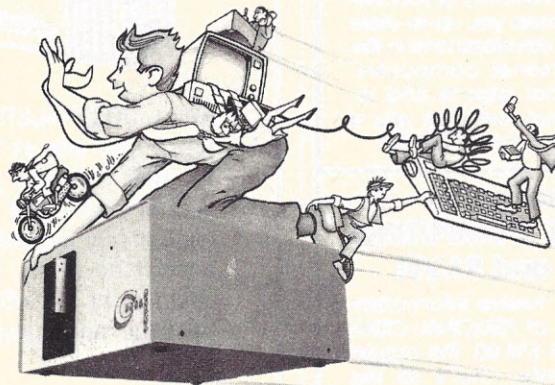
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5 LEASEINT Interest rate on lease
6 BREAKVEN Breakeven analysis
7 DEPRSL Straightline depreciation
8 DEPRSY Sum of the digits depreciation
9 DEPRDB Declining balance depreciation
10 DEPRDDB Double declining balance depreciation
11 TAXDEP Cash flow vs. depreciation tables
12 CHECK2 Prints NEBS checks along with daily register
13 CHECKBK1 Checkbook maintenance program
14 MORTGAGE/A Mortgage amortization table
15 MULTMON Computes time needed for money to double, triple, etc.
16 SALVAGE Determines salvage value of an investment
17 RRVARIN Rate of return on investment with variable inflows
18 RRCONST Rate of return on investment with constant inflows
19 EFFECT Effective interest rate of a loan
20 FVAL Future value of an investment (compound interest)
21 PVAL Present value of a future amount
22 LOANPAY Amount of payment on a loan
23 REGWITH Equal withdrawals from investment to leave 0 over
24 SIMPDISK Simple discount analysis
25 DATEVAL Equivalent & nonequivalent dated values for oblig.
26 ANNUDEF Present value of deferred annuities
27 MARKUP % Markup analysis for items
28 SINKFUND Sinking fund amortization program
29 BONDVAL Value of a bond
30 DEPLETE Depletion analysis
31 BLACKSH Black Scholes options analysis
32 STOCVAL1 Expected return on stock via discounts dividends
33 WARVAL Value of a warrant
34 BONDVAL2 Value of a bond
35 EPSEST Estimate of future earnings per share for company
36 BETAALPH Computes alpha and beta variables for stock
37 SHARPE1 Portfolio selection model-i.e. what stocks to hold
38 OPTWRITE Option writing computations
39 RTVAL Value of a right
40 EXPVAL Expected value analysis
41 BAYES Bayesian decisions
42 VALPRINF Value of perfect information
43 VALADINF Value of additional information
44 UTILITY Derives utility function
45 SIMPLEX Linear programming solution by simplex method
46 TRANS Transportation method for linear programming
47 EOQ Economic order quantity inventory model
48 QUEUE1 Single server queueing (waiting line) model
49 CVP Cost-volume-profit analysis
50 CONDPFOT Conditional profit tables
51 OPTLOSS Opportunity loss tables
52 FQIOQ Fixed quantity economic order quantity model
53 FQEOUSH As above but with shortages permitted
54 FQEOQPB As above but with quantity price breaks
55 QJUECB Cost-benefit waiting line analysis
56 NCFANAL Net cash-flow analysis for simple investment
57 PROFIND Profitability index of a project
58 CAP1 Cap. Asset Pr. Model analysis of project

59 WACC Weighted average cost of capital
60 COMBAL True rate on loan with compensating bal. required
61 DISCBAL True rate on discounted loan
62 MERGANAL Merger analysis computations
63 FINRAT Financial ratios for a firm
64 NPV Net present value of project
65 PRINDLAS Laspeyres price index
66 PRINDPA Paasche price index
67 SEASIND Constructs seasonal quantity indices for company
68 TIMETR Time series analysis linear trend
69 TIMEMOV Time series analysis moving average trend
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82 TIMUSAN Time use analysis
83 ASSIGN Use of assignment algorithm for optimal job assign.
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89 DEPRSF Sinking fund depreciation
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91 ENVELOPE Types envelope including return address
92 AUTOEXP Automobile expense analysis
93 INSFILE Insurance policy file
94 PAYROLL2 In memory payroll system
95 DILANAL Dilution analysis
96 LOANAFDD Loan amount a borrower can afford
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Organizing Tool And Livelier Graphics Among New Software

ORGANIZE YOUR DESK

Here it is—just what every overworked manager or executive needs: a tool that will help him organize the information he needs to do his job.

It's called, appropriately enough, The Organizer, and it comes from Conceptual Instruments, a new company in Philadelphia.

The Organizer contains those functions the company feels are used on an executive's desk more than any other function—a note generator, a small filing system, a programmable calculator, a clock and an appointment calendar.

The neat thing here—the thing that makes this program really interesting—is the interlinking of each of the program segments with all the others. As the company

touch another key to update your telephone log.”

And that's just the stuff the program will do that's readily apparent to the user. There are other features. For example, the program handles tasks normally assigned to an operating system, like maintenance of directories, formatting of disks, copying disks, communications with I/O and mass-storage devices, and error detection and recovery.

When the user gets his hands on The Organizer, he gets a system manual, a single copyable disk, and a clock card. He needs to have at least one peripheral slot open in his Apple II Plus to accommodate the clock card, or else the program won't be able to maintain time and date. But one of those slots will already be taken up by the 16k RAM card that the system needs to run, and the other by the controller card for the two disk drives that are needed for system operation.

The clock card, which is used to maintain the system clock, reminds the user of appointments, performs a number of similar functions, and includes a separate printed-circuit edge-card connector to hook up to an automatic dialer, which will be available “in a couple of months,” according to a company spokesman.

A version of The Organizer is available now for the Apple II. The company hopes to have a second version, for the IBM Personal Computer, available soon.

The Organizer sells for \$250. When the auto dialer becomes available it will cost \$75 more. If you wish to purchase a manual only, it costs \$25, but this amount can then be applied to the purchase of the program.

FOR MORE INFORMATION: CONCEPTUAL INSTRUMENTS CO., 4730 Warrington Ave., Philadelphia, PA 19143; (215) 726-7856.



The Organizer package contains a note generator, a filing system, a clock and a calendar.

says in its promotional brochure: “...you hear a pleasant tone. Glancing at your video display, you notice a reminder to contact an important client. You pick up the telephone and touch a number on the keyboard. The call is placed. While the number is ringing, you touch another key, recalling notes from a previous conversation. During the call, you page through an appointment calendar, schedule a meeting, review and revise an agenda, then generate a memo about it all for circulation to a selected list of associates. When you have finished a call, you

ULTIMATE GRAPHICS PROGRAM

After spending two years in the development laboratory, Graphics Processing System (GPS) is now ready for its public debut. If it lives up to the advance billing that its developer, Stoneware, is trumpeting, (“the ultimate in user-friendly graphics programs”), it should do well.

Stoneware, which publishes DB Master, a well-known data-base management program, says that GPS creates, manipulates and edits graphics in the same way that a word processor edits text. “With a little practice,” says Ken Klein, Stoneware’s chief executive officer, “even an inexperienced beginner on the Apple II Plus will find that he or she can produce professional-quality graphics quickly at low cost.”

Available for
IBM PC and Apple III



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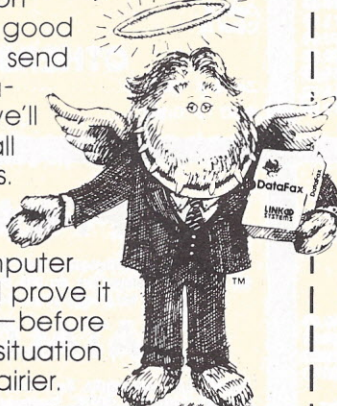
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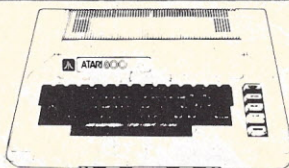
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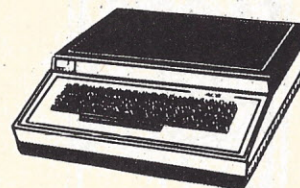
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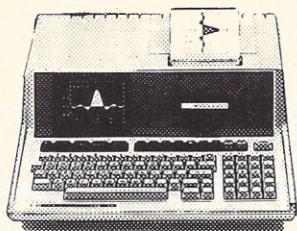
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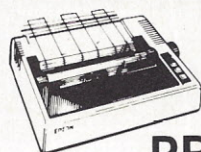
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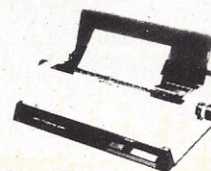
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SOFTWARE OF THE MONTH

What does the program do that makes it unique?

Stoneware says it has several features that add to the easy-to-use nature of the product. Among them are a grid that allows drawing to be done to scale with all dimensions then changed in the same ratio; six primary colors that can be mixed; two zoom features for greater detail resolution; unlimited duplication of images to disk and from disk—a boon to those who have drawings that contain many repetitious parts; text capabilities; overlays that can be printed out separately in different colors, and an editing capability that allows the user to erase a portion of the image he created without having to start again from scratch.

There are two versions of the Graphics Processing System—the standard version and the professional version. If you get the standard version, you can input to it using any Apple-compatible paddle or joystick. The professional version, in addition to that, is also compatible with the Apple Graphics tablet, Symtek light pen, and HiPlot digitizers 3, 4 and 6 from Houston Instruments.

You can throw in a 16k RAM card, too, and the Graphics Processing System will access it with no problem, Stoneware says.

If users run into a problem with Graphics Processing System, they will have the backup of the company's technical support group, which is available for user inquiries over the phone during business hours.

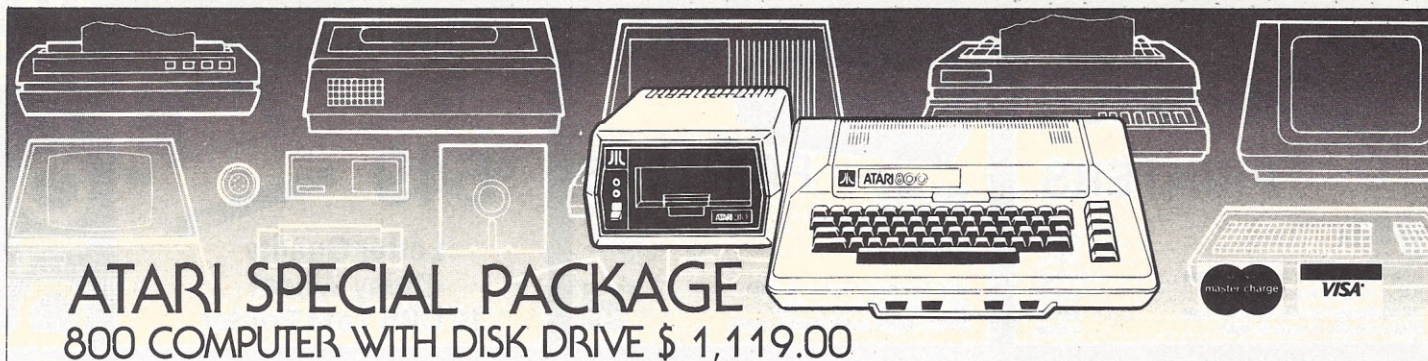
The professional version of the program sells for \$99.95, and the standard version sells for \$59.95.

FOR MORE INFORMATION: STONEWARE, INC., 50 Belvedere St., San Raphael, CA 94901; (415) 454-6500.

SOFTWARE ENCRYPTION PACKAGE

A new software encryption package from Epic Computer Products promises program and data security without hardware modification. The program, which uses two-layer security, incorporates both a public encryption key and a password-protected decryption key or deadbolt.

Epic vice president of sales Jim Knox says the program



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SOFTWARE OF THE MONTH

is applicable in any small-business application, and is ideal for transmitting and securing sensitive data such as legal contracts and payroll data.

Called Kryptyk, the program is designed for transmission of proprietary information and is more secure than conventional single-key software because it has two layers of security, according to Knox.

Knox says that most similar encryption systems use either a password or encryption key, but not both.

Kryptyk users can generate secure encryption keys of from 12 to 300 digits. Two thirds of the key is publicly accessed. The remaining digits are retained by the user who is transmitting the encrypted data. Also, using Kryptyk, users can generate as many security keys as they desire, specifying the length from 40 to 1000 bits. Each key bit, says Epic, doubles the security of the data.

Epic is a new company, formed only two months ago with the merger of Crown Manufacturing, an offshore manufacturer; Epic Computer Corp., a computer systems producer; and MQI, a distributor.

Kryptyk is priced to distributors and dealers to sell for about \$250. The package is available now.

FOR MORE INFORMATION: EPIC COMPUTER PRODUCTS, 10725 Ellis, Suite B, Fountain Valley, CA 92708; (714) 963-7898.

NEW OPERATING SYSTEM FOR IBM PERSONAL COMPUTER

Phase One Systems of Oakland, Calif., has released Oasis-16, a multiuser operating system for the IBM Personal Computer. The system costs \$1495 and requires a 5M Winchester hard disk drive, 128k of RAM, a monochrome display adapter, and a 5¼-inch floppy-disk adapter with two drives. It will support up to 640k of RAM and Corvus or XComp hard disk drives.

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Atari Basic Cart	49	Telecom	59
850 Interface	159	Gorf	33



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Fourth Controller	89	The Grappler	124
Rana Elite One	389	Versa Writer	209
Rana Controller	99	Joystick by TG	46
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Micro Sci A-40	384	The Mill	319
Micro Sci A-70	489	Lower Case	29
Vista 8" Drive		Expan. Chassis by Mtn	559
8" Controller	439	Hard Disk	CALL
16K Ram	68	Appli-Card	339
AIO II	189	Strobe Plotter	659
CCS 7710A	129	Soft Term	109
CPS Multi Func by Mtn	185	Super Saver Fan	74
Metacd by Metamorphic	895	Amber Monitor by USI	179
Micro Modem II	278	Videx Function Strip	59
Smart Modem	229	Bubble Mem by MPC	CALL
Enhancer II	124	App-L-Cache 256K	995
Microbuffer II (16K)	209	Vista Vision 80	269
Microbuffer II (32K)	229	ALF 9 Voice	149
32K by Saturn	199	Pkasso by IS	CALL
Num. Keypad (23 Key)	115	Premium PAK by M. Soft528	
Disk Emulator (294K)	799	AD+DA by Mtn (no cable)	269
Sup R Mod	33	Apple Cat II	339
Soooper Spooler (16K)	299	Wizard-BPO	149
Z-80 by Microsoft	248	Wizard-SOB	219
Videoterm (80 Col)	258	Thunder Clock/Cal	119
Signalman Modem	79	Smarterm 80 Col. Card	288
Synergy Card by Spies	169	Mus Sys by Mtn (16 voi)	297
RGB by Elechome	CALL	8088 Card by ALF	295
Parallel Card	69	Synergizer Pack by ALS	579
Z-Card by ALS	189		

SOFTWARE

Alkemstone	34	Word Star	199
Castle Wolfenstein	24	Basic 80	284
Gorgon	35	Basic Compiler	299
Time Zone	79	Calc Star	166
Soft Porn	29	Mail Merge	79
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Dead Line	39	T/Maker	229
Cyclod	24	CP/M Catalog	FREE!

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Combo Cd by Apparat	239	Quadboard 64K	499
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128K Combo by AST	639	Parallel Card	129
192K Combo by AST	799	Time Clock	129
256K Combo by AST	979	Baby Blue by Xodex	599
64K Mem by AST	335	64K + by Seattle	389
128K Mem by AST	499	128K + by Seattle	539
192K Mem by AST	669	192K + by Seattle	689
256K Mem by AST	799	256K + by Seattle	799
512K (w/Serial) by CI	995	Amdek Color II	769
Hard Disk by Davong	1650	Percom Drives	CALL
64K by Macrolink	369	Smart Modem	209
128K by Macrolink	519	Microsoft	CALL
192K by Macrolink	659		

SOFTWARE

Volks Writer	159	The Programmer	369
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Basic Compiler	349	Home Accounting Plus	129
Easy by Denver	CALL	Super Writer by Sorcim	289
Visicalc (256K)	199	Mathemagic	69

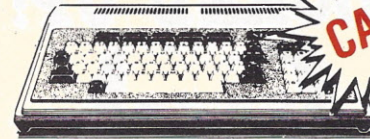
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SOFTWARE OF THE MONTH

multiple users trying to get into the same memory space, which could destroy stored information.

In addition, the operating system's direct compatibility with regular Oasis-based software written in BASIC or C makes over 400 professionally prepared programs immediately available for the computer.

FOR MORE INFORMATION: PHASE ONE SYSTEMS, 7700 Edgewater Dr., Suite 830, Oakland, CA 94621; (415) 562-8085.

\$195 EASYPLANNER, A PROGRAMMABLE SPREADSHEET

Information Unlimited Software has introduced EasyPlanner, an advance in spreadsheet software for the IBM Personal Computer.

EasyPlanner has the power of many spreadsheets combined in one. It gives the user the ability to divide a planning task into easily manageable segments and to

devote a spreadsheet to each. Data from subordinate sheets may then be automatically entered into a master spreadsheet—and/or any other spreadsheets on the disk.

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Operation can be made very simple by user programming. Whoever creates the spreadsheet can program it to follow an automatic sequence of work steps from loading the sheet to printout. Then, an operator simply follows prompts to enter fresh data and print an updated spreadsheet. Programmed spreadsheets enable a businessperson to collect uniformly organized data from many employees who know little or nothing about computer operation.

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APPLE MECHANIC by Bert Kersey SHAPE WRITER/ZAP UTILITY

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MORE: A disk PACKED with useful music, text & hi-res tricks for use in YOUR PROGRAMS.

**\$2950 Includes Apple Tip Book #8
and Peeks & Pokes Chart**

UTILITY CITY 21 UTILITIES ON ONE DISK by Bert Kersey

LIST FORMATTER makes custom listings with page breaks; each statement on new line, if then's called out and loops indented. MULTICOLUMN CATALOG in any page-width. Put invisible commands in programs. Alphabetize & store info. Make trick & invisible file names. Append programs. Convert hex. Dump text to printer. Auto-post Run Number/Date in programs...More: 21 LISTABLE PROGRAMS Total!

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and Peeks & Pokes Chart**

DOS BOSS DISK COMMAND EDITOR by Bert Kersey & Jack Cassidy

A classic utility you will ENJOY. Rename commands/error messages. PROTECT PROGRAMS (unauthorized save-attempt produces "Not Copyable" message). LIST-PREVENTION too. One-key program-run from catalog. Change Disk Volume heading to your title with or without volume number. Fascinating documentation. Hours of good reading & experiments.

All changes may be appended to your programs, so that anyone using your disks (booted or not) will be using DOS the way YOU formatted it.

**\$2400 Includes Apple Tip Book #2
and Peeks & Pokes Chart**

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100 programs from Beagle Bros Tip Books 1, 2, 3 & 4—Hi-Res/Lo-Res/Text/Sound. All listable, copyable and changeable; each teaches another fascinating Apple programming trick!

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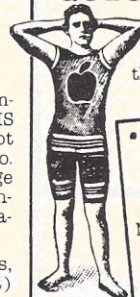
ALPHA PLOT HI-RES GRAPHICS/TEXT UTILITY by Bert Kersey & Jack Cassidy

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FOR MORE INFORMATION: INFORMATION UNLIMITED SOFTWARE INC., 204 Marinship Way, Sausalito, CA 94965

DATA COMMUNICATIONS FROM HAYES

Hayes Microcomputer Products Inc. has released its first data communications software product. The Terminal Program, for the Hayes Micromodem II and Apple II, originates and answers calls; creates, lists, sends, and receives files; and manages communications—as directed by commands selected from a menu or list of options.

“The Terminal Program introduces our entry into software development and demonstrates our commitment to supporting our products,” says Dennis C. Hayes, president of Hayes. “This Terminal Program realizes a major goal: to develop software products that are easy to learn and easy to use and that take full advantage of our hardware features.”

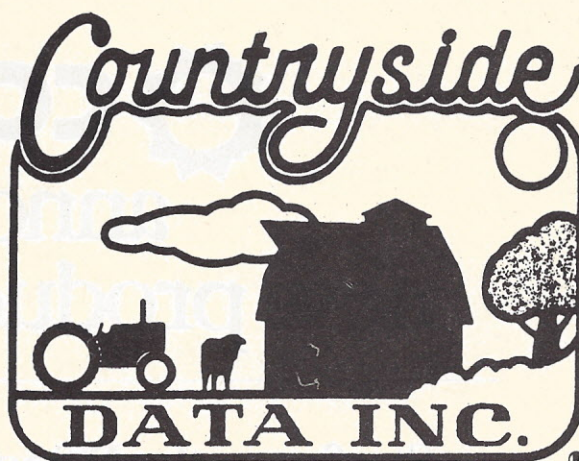
The Terminal Program is compatible with three Apple operating systems: DOS 3.3, Pascal, and CP/M. It supports up to six disk drives, several printer interface cards, forty and eighty column screens, and lower case characters. It stores three phone numbers and one prefix for more convenient dialing. Suggested retail price is \$79.00.

The Terminal program is also included in the Hayes Micromodem II package. Suggested retail price for the Micromodem II package is \$399.00.

FOR MORE INFORMATION: HAYES MICROCOMPUTER PRODUCTS, INC., 5835 Peachtree Corners East, Norcross, GA 30092

CHEMISTRY SOFTWARE SOLUTIONS

Radio Shack is offering software that simulates actual chemistry laboratory experiments. Chemistry

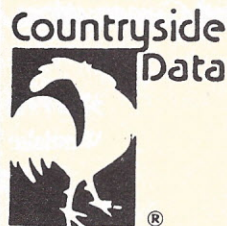


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CIRCLE 93



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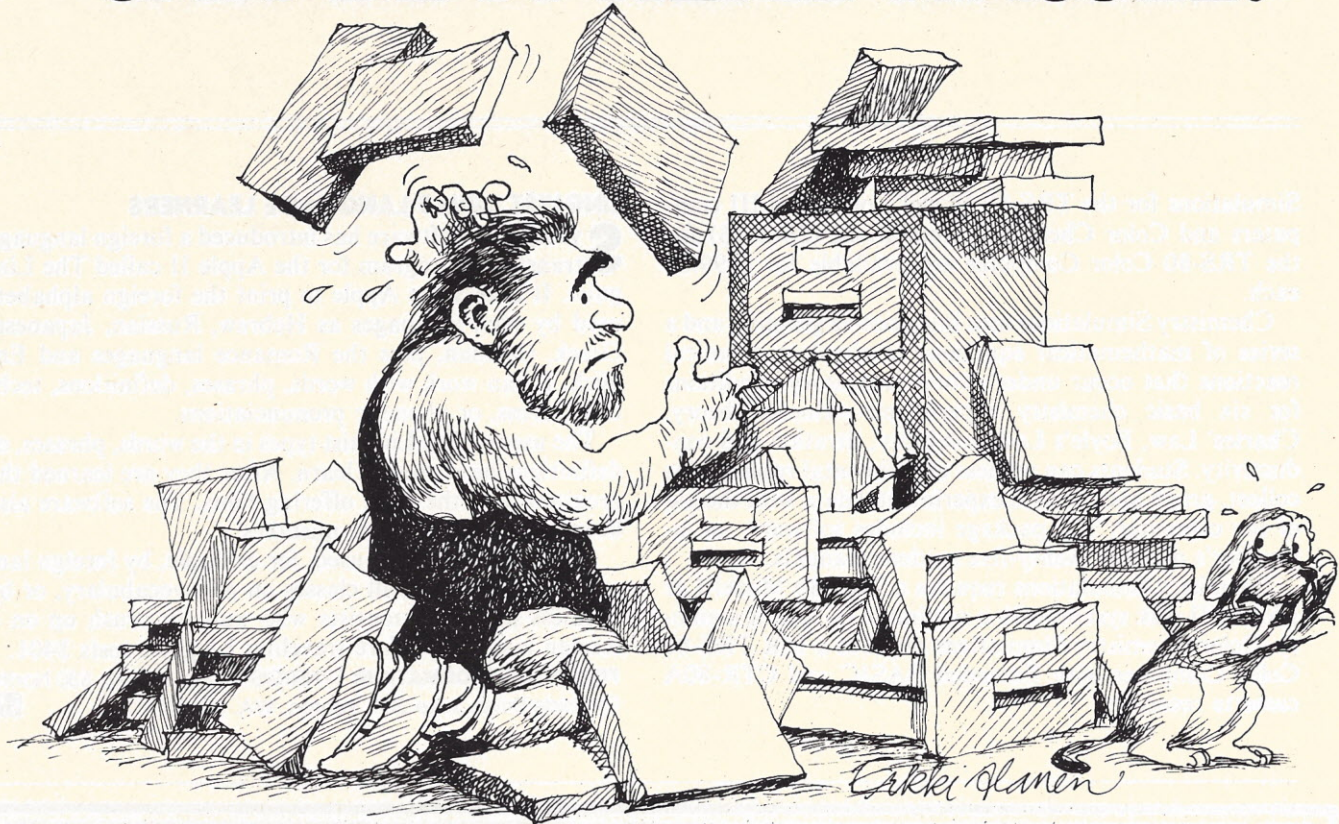


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CIRCLE 149

SOFTWARE OF THE MONTH

Simulations for the TRS-80 Model I or Model III computers and Color Chemistry Simulations (26-2626) for the TRS-80 Color Computer are available for \$199.00 each.

Chemistry Simulations uses imaginative graphics and a series of mathematical equations to simulate chemical reactions that occur under actual laboratory conditions for six basic chemistry experiments—kinetic theory, Charles' Law, Boyle's Law, solubility, titration and conductivity. Students can witness experimental results, plus collect, graph and analyze experimental data with the aid of the computer. The package includes software, an instructor's manual twenty-five student manuals.

Chemistry Simulations requires a TRS-80 Model I or Model III disk system with a minimum of 32K of memory. Color Chemistry Simulations requires a 16K TRS-80 Color Computer with Extended BASIC and CTR-80A cassette recorder.

LINGUIST DRILLS LANGUAGE LEARNERS

Synergistic Software has introduced a foreign language translation program for the Apple II called The Linguist. It allows the Apple to print the foreign alphabets used by such languages as Hebrew, Russian, Japanese, Greek, German, plus the Romance languages and English. It can work with words, phrases, definitions, technical terms, or phonetic pronunciations.

The user of The Linguist types in the words, phrases, or definitions he wishes to learn. After they are learned the program tests the user, offering hints. The software also keeps score and corrects mistakes.

The Linguist can be used, for example, by foreign language teachers to drill classes on new vocabulary, or by business people or tourists who want to brush up on a foreign language before traveling. Linguist costs \$401.

FOR MORE INFORMATION: SYNERGISTIC SOFTWARE, 830 North Riverside Drive, Suite 201, Renton, WA. 98055.



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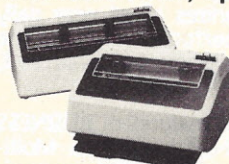


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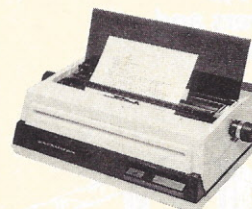


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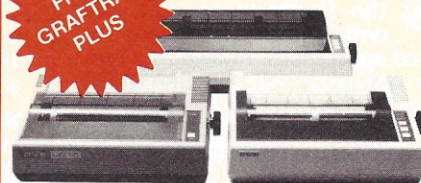
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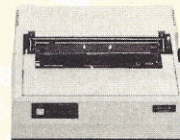
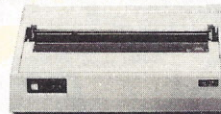


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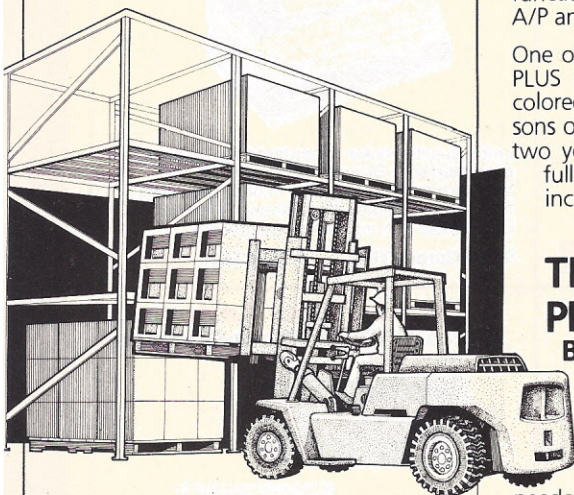
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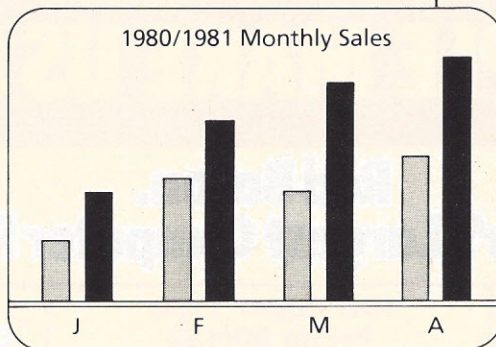
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BUSINESS PLUS is a collection of programs which interact to store and ma-

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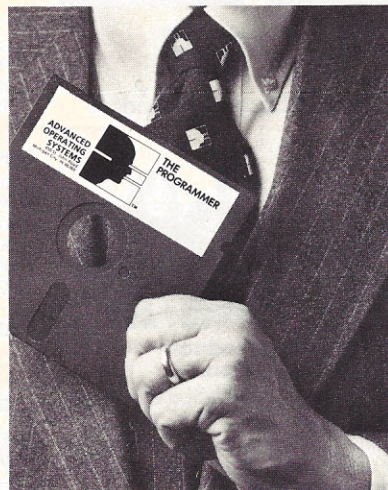


graphs. It organizes all of your daily records and performs most of the functions typically associated with A/R, A/P and general ledger.

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THE PROGRAMMER: BASIC-Code Program Generator

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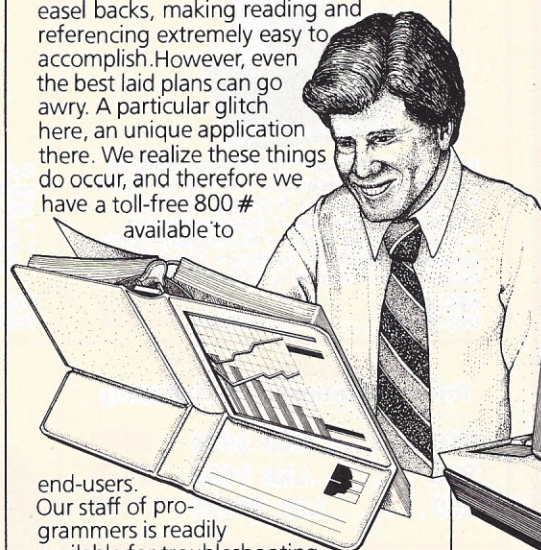


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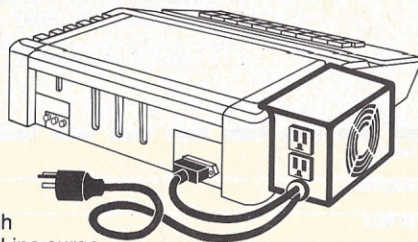


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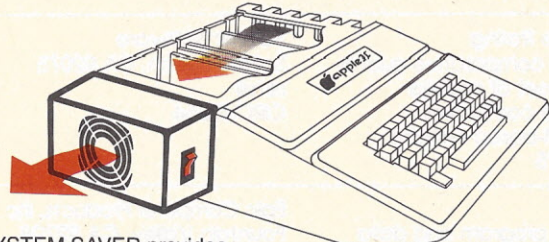
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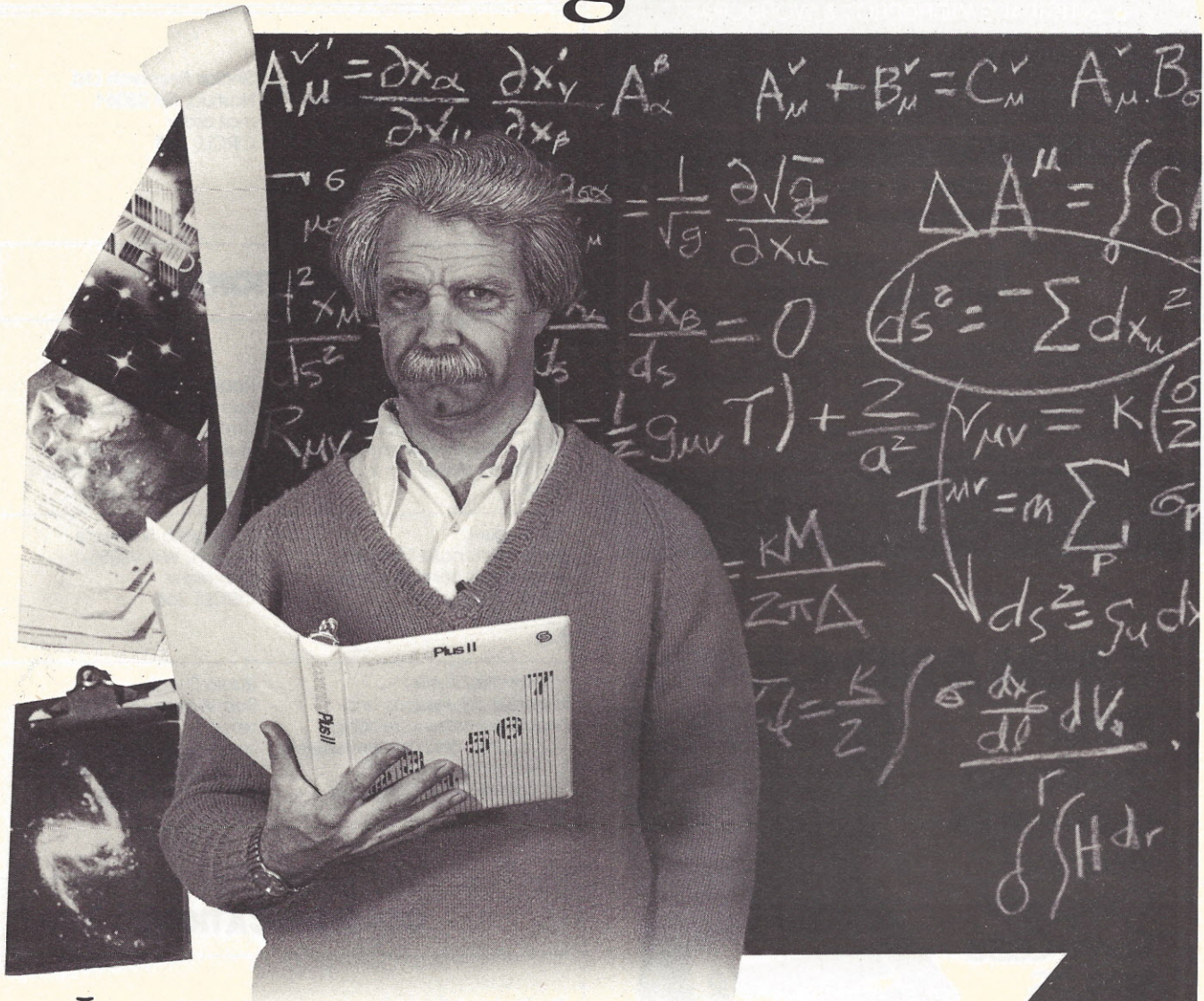
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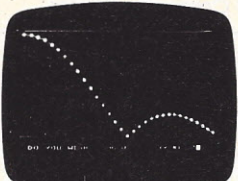
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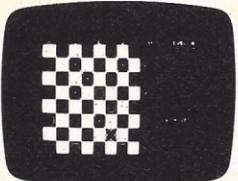
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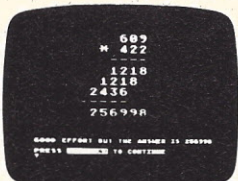
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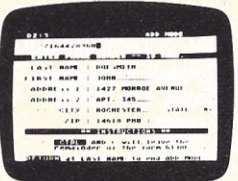
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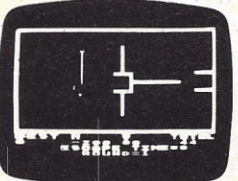
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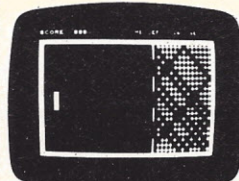
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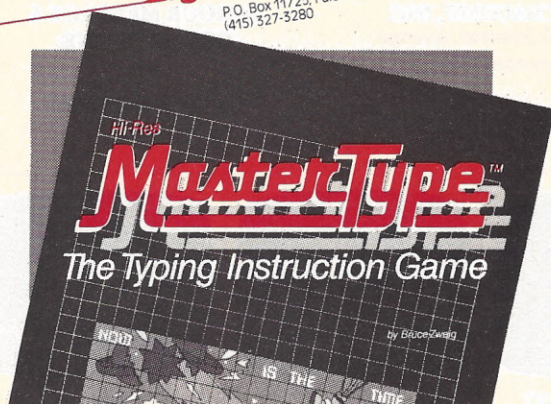
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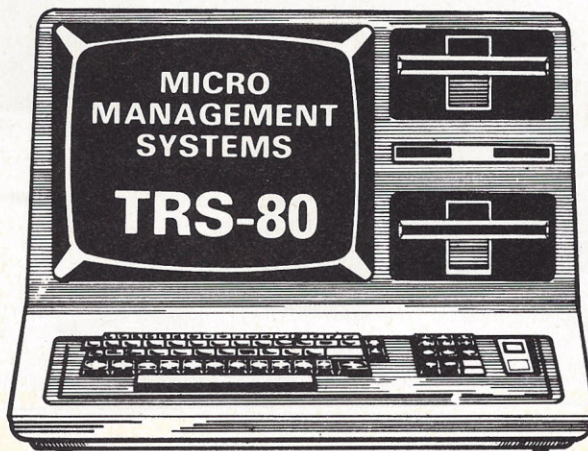
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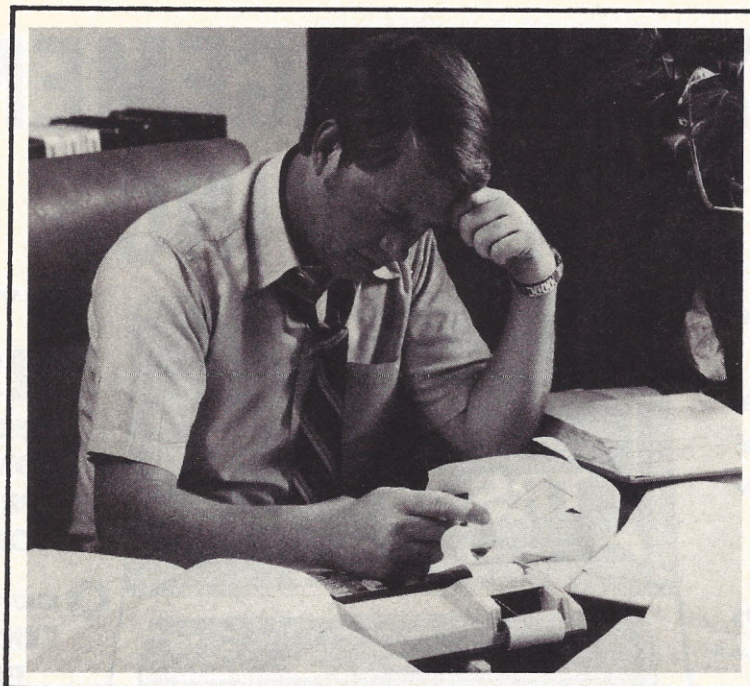
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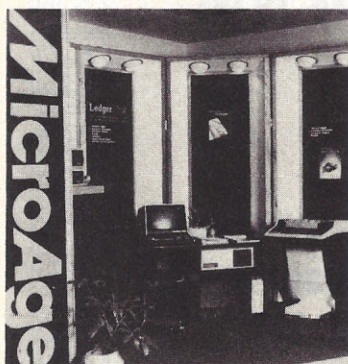
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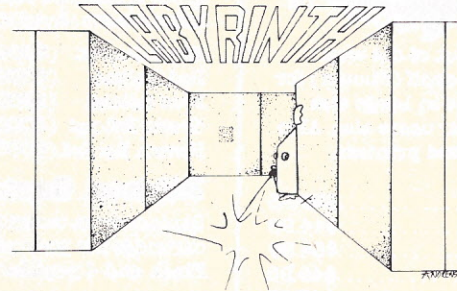
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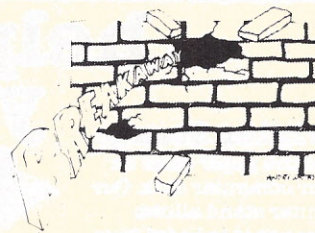
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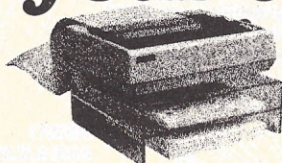
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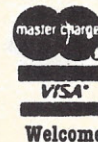
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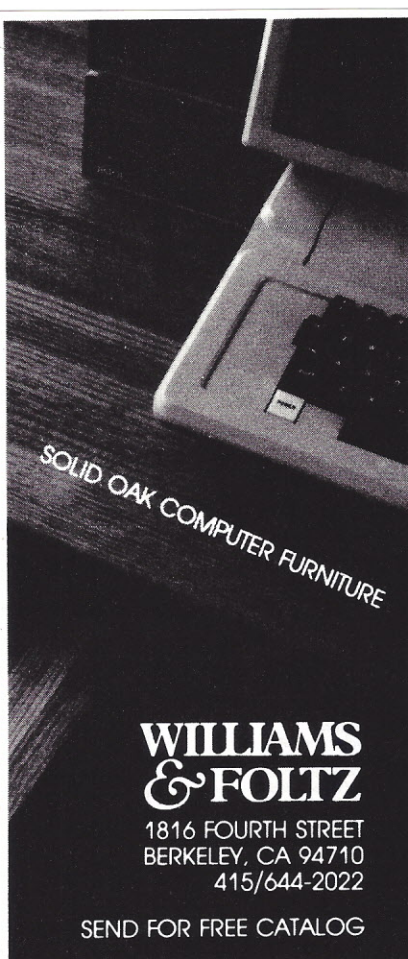
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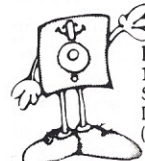
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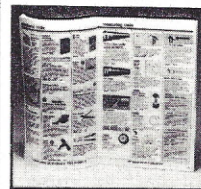
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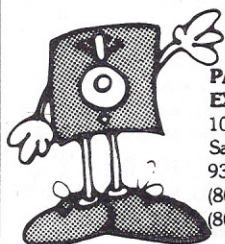
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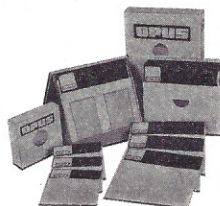


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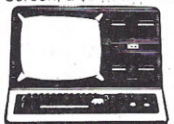
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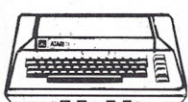
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50	Addison-Wesley Publishing Co.....191	25	Edu-Ware Services, Inc.....56,57		Perry Oil & Gas.....256-3
122	Advanced Computer Products.....256-14	12	800 Software, Inc.....23		Personal Software/see Visicorp.....36
114	Advanced Operating Systems.....246	64,117	Epson America, Inc.....160,180	100	Personal Computers.....184
177	The Allen Group.....220,256-4	33	Franklin Computer Corp.....90,91	13	Plus Computer Technology, Inc.....27
45	Alphanetics.....256-7	72	Frederick E. Deeg & Associates.....164	173	Pocket Computer Newsletter.....210
55	Amdek Corp.....168		Futra.....256-20	146,168	Programmers Institute.....187,189
43	Anadex.....143	186	G.H. Computer Systems.....262	92	Quadram Corp.....71
129	Apple Computer, Inc.....132,133	189	Gladstone Electronics, Inc.....262	163	Quark Engineering.....84
124	Appware, Inc.....228	105	Great Plains Software.....92	77	QUME.....151
148	Applied Software Technology.....221	101	The Happy Computer.....222	141	Racet Computes, Ltd.....208
	ARCsoft Publishers.....216	175	Harcourt Brace Janovich.....256-3	20	Radio Shack.....33
94,130	Artworx Software Co., Inc.....65	133	Hayden Book Company, Inc.....226,227	40	Rana Systems.....106,107
	ASAP Computer Products.....185,225	170,56,169	Hayden Software.....149,206,207,237	37	RCA.....121
	Atlantic Cabinet.....256-5	34	Hayes Microcomputer Products, Inc.....135	192	Reader's Digest.....262
103	Atari.....123		Howard Software Services.....15		R.H. Electronics.....256-7
31,160	Bausch & Lomb/Instruments & Systems Div.....28	3	IBM.....4	121	RKS.....210
112	B. Dalton Bookseller.....209	73	InnoSys.....158	21	Sanyo Business Systems Corp.....89
96	Beagle Bros.....240	152	Integral Data Systems.....213	89	Savvy Marketing.....199
47	The Bench Collection.....112,113	63	I.Q. Systems.....159	52,44	Sensible Software, Inc.....88,193
39	Bible Research Systems.....146	70	I.U.S.....170	180	Seven Mile Systems, Inc.....261
	Border Software.....256-8	182	Jensen Tools, Inc.....261	139	Shale Diversified Enterprises.....261
110	The Bottom Line.....201	71	Jimsco, Inc.....214	165	Sharp Electronics Corp.....35
162	B.T. Enterprises.....256	155	Jini Micro-Systems.....250		Sinclair Research, Ltd.....42,43
8	Business Planning Systems.....16	153	Kensington Microware Ltd.....248	15	Smith-Corona.....31
174	Calsoft.....256-10	166,167	Leading Edge Products, Inc.....264,C-3		Soft Sector Marketing.....256-22
83	Centennial Software.....171		Library of Computer & Information Sciences.....73	187	Software Galore.....262
85	Centronics.....171	116	Lightning Software.....252	36	Software Publishing Corp.....44
46	Chang Labs.....211		Link Systems.....233		Software Solutions.....256-20
113	Charles Mann & Associates.....188		Lobo Drives.....256-16,256-17		Software Technology for Computers.....178,223
150	Check-Mate.....260,262	185	Magnetic Information Systems, Inc.....261		Software Training Co.....256-15
	Chromonetics Corp.....256-11		Master Electronics.....256-13	143	Sorcim.....203
79,80	CLOAD Magazine, Inc.....154	22	Maxell Corporation of America.....127		The Source Telecomputing Co.....192
10,156	Coast Computer Supply.....256-13	178	M.B. Rowe & Associates.....261	118	Southern Case.....250
	Commodore, Inc.....20,21,C-4	58	M.C. Software.....144	111	Southwestern Data Systems.....204
32	CompuServe.....81	60	Memotech Corporation.....205		Spectrum Software.....256-24
119	Computer Apparatus.....256-13	159	MicroAge Computer Stores.....254	14,97,98	SSM Microcomputer Corp.....179,181,183
188	Computer Case.....238	99	Micro Business World.....186	61	Standard Microsystems, Inc.....155
137	Computer Discount of America.....262	28	Microcom.....63	82	Standard Software.....161
	Computer Mail Order.....234,235		Microcomputer Service Center.....256-22	86	Star Micronics.....162,163
	Computer Outlet.....256-19	135	Micro Flash.....260	149	Stoneware Microcomputer Products.....243
	Computer Shopper.....256-5		Microhouse.....138,139	176	Superior Software, Inc.....256-11
147	Computer Specialties.....239	49,62	Micro Lab, Inc.....116,157		Synapse Video.....238
	Computer Warehouse.....256-21		Micromail.....256-7	81,154	Systems Plus.....177,249
	Computer World International, Inc.....256-9	158	Micro Management Systems, Inc.....253	125	Tarbell Electronics.....215
144	Computronics.....231	24	Micro Printer Marketing.....39	27	Taurus Software Corp.....217
69	Comrex International.....197	51	Micro Pro International.....76	191	Tech-Data Corp.....262
115	Condor Computer Corp.....212	142,35	Microsoft Computer Products.....25,98,99	18	Tecmar, Inc.....49
87	Consumer Computers.....172	16	Microstuf, Inc.....129	48	TeleVideo Systems, Inc.....114,115
127	Contract Services Associates.....182	108	Micro-Z Applications.....198	5	Texas Instruments, Inc.....9
65	Corona Data Systems.....242	74	Mini Micro Mart.....164	171	T.H.E.S.I.S.....262
7	Corvus Systems.....12	2	Mountain Computer, Inc.....1	140	TMI/Master Image.....228,256-20
93	Countryside Data, Inc.....241	109	National Integrated Software Services.....176		Total Access.....256-12
164	CPU Shop.....257		National Software Systems.....109	190	Total Information Services.....262
	Cranford Computer Furniture Co.....256-18	67	National Software Systems.....109	123	TransNet Corporation.....193
84	Creative Computers.....256-22	172	Nebis Computer Forms.....247	53	TSK Electronics Corp.....131
	Cybernetics.....230	1	NEC Home Electronics.....Cover-2	145	Unicom Marketing Corp.....236
68	Data Services, Inc.....256-5	54	NEC Information Systems.....137	29	Universal Data Systems.....68
57	Data Technology Industries.....165,166,167		NRI Schools/Elec. Div.....119	126	User's Software.....215
104	Davong Systems Inc.....145	128	Okidata.....194-195	6	Vindex.....19
138	Decision Support Software.....196	30	Omni Resources Corp.....147		Visicorp/see Personal Software.....36
	Diamond Head Software.....261	88	On Line Micro Centers.....169	38	Vista Computer.....100
	Digital Equipment Corp.....10,11	151	Orange Micro, Inc.....245	9	Votrax.....79
11	Dilithium Press.....244		Osborne Computer Corporation.....6	91	Vynet.....190
120	Discount Software.....218,219	136,183	Pacific Exchanges.....260,261	106	Wabash DataTech Inc.....152
	Doss Industries.....256-3		Palomar Computer Products.....256-6	134	Western Electronics.....229
	Dow Jones.....108	42	Parasonic.....110,111	26	Westico, Inc.....61
107	Dresselhaus Computer Products.....188	181	Passage Research.....261	132	Williams & Foltz Computer Furniture, Inc.....260
95	Dymarc Industries.....196	23	Peachtree Software.....66,67	76	The Woodworks.....173

ADVERTISING STAFF

SALES ADMINISTRATOR
Joy Nichols

SALES COORDINATOR
Anne Lacitignola

PROMOTION MANAGER
Leslie Bouffard

PUBLISHER
Robert J. Lydon

DISTRICT MANAGERS

Ferris Ferdon (214) 231-0523

William Knickel (408) 736-6667

Scott McLean (213) 614-5644

Robert Pavone (201) 843-0550

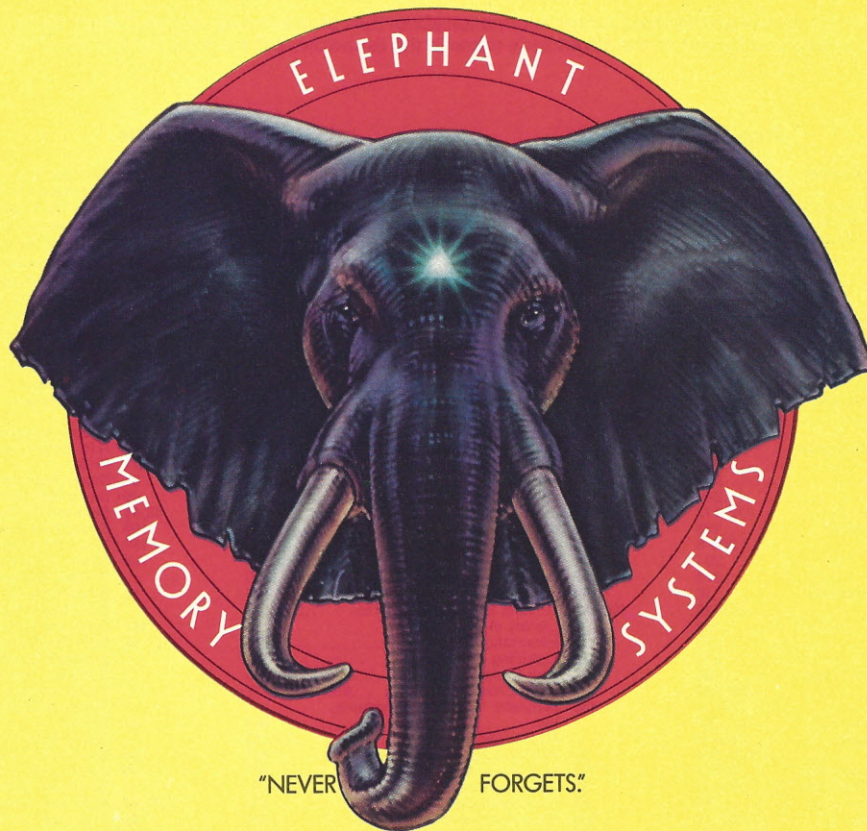
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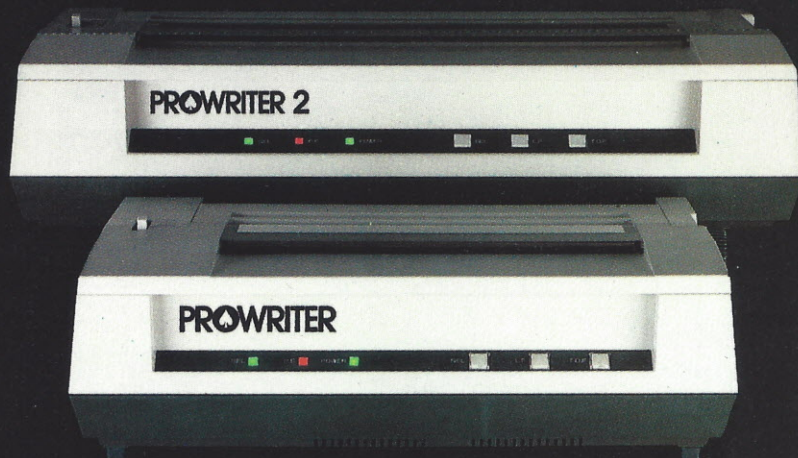
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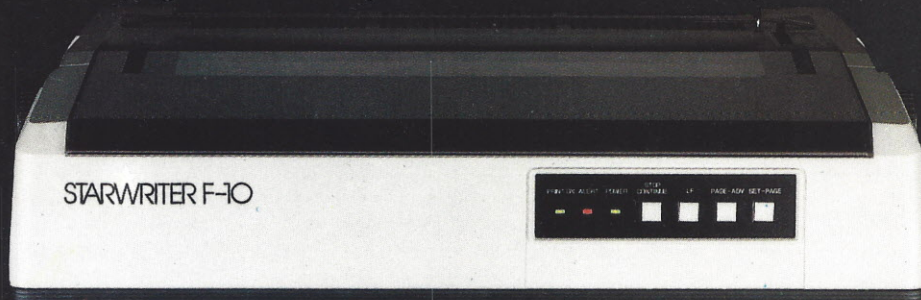
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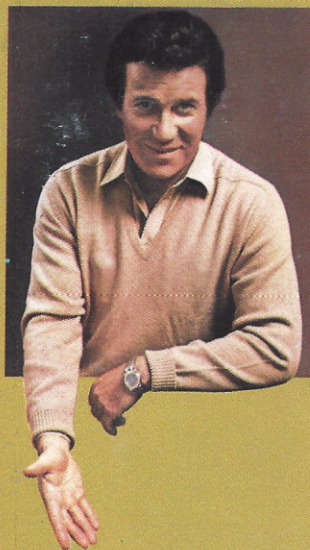


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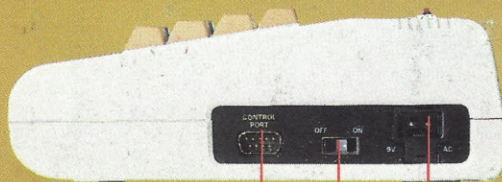


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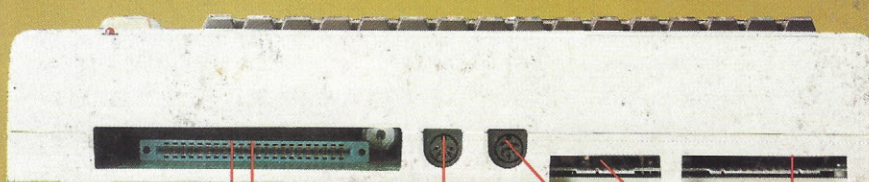
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